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THESIS

**BUILDING COLLABORATIVE CAPACITY FOR
BIOSECURITY AT THE GEORGIA SEAPORTS**

by

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March 2007

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**BUILDING COLLABORATIVE CAPACITY FOR BIOSECURITY AT THE
GEORGIA SEAPORTS**

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ABSTRACT

When public health interventions are incorporated into a comprehensive seaport security strategy, they can effectively prevent and reduce morbidity and mortality, resulting from natural or man-made disasters. The challenge is to build collaborative capacities through new and renewed seaport surveillance activities among government agencies and private companies to strengthen the role of public health to detect, intercept, and mitigate the potential effects of the intentional or unintentional introduction of diseases. Currently, effective collaborative processes between public health agencies and other local, state and federal partners in seaport security are weak and primarily the result of informal activities. Although seaport security receives considerable policy attention in other areas of risk management, such as radiological detection, public health investments are relatively neglected. Effective, sustainable approaches to building interagency collaboration could prove to be an indispensable homeland security initiative to prepare for a bioterrorism attack or other infectious disease incidents.

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I. INTRODUCTION

A. SAVANNAH PORT INCIDENT; OCTOBER 18, 2005

The Chatham County Health Department, Coastal Health District (CHD), received a message from an unidentified worker at the Port of Savannah stating that a ship with dead birds on board had arrived from China. The caller stated that U.S. Customs and Border Protection (CBP) had instructed the crew to “clean up the mess,” but had not taken any further actions. Internal local and state public health notifications were initiated and an attempt was made to identify the caller by contacting the Centers for Disease Control and Prevention (CDC) Atlanta Quarantine Station (ATL QS) to ascertain if their office knew about this incident. The Medical Officer stated he was not aware of the incident, but he told CHD who to contact at the Savannah Port CBP office to facilitate further investigation.

The CBP office was contacted and the identity of the initial caller was determined to be a CBP officer, who verified the report that a cargo vessel had arrived from China with dead birds on board. The CBP officer confirmed that the crew had thrown several carcasses onto the dock and that CBP had instructed the crew to collect the birds and return them to the vessel. Concerned about avian influenza, the CBP officer expressed her frustration with the difficulty of contacting public health during the lunch hour. She had tried several phone numbers, but no one answered. She left a voicemail message for a public health staff member who was out of the office for the day. She finally reached a clerk who recorded an incomplete message. The officer requested public health guidance for further precautionary interventions. Local and state public health, in consultation with the ATL QS, advised CBP to verify the ship’s itinerary and the health status of all crew and passengers. Subsequently, Chatham County Environmental Health and Georgia Department of Agriculture officials responded to the scene.

The vessel master stated the ship had sailed through a hurricane off the Baja coast of California and hundreds of birds had taken refuge on the ship. After the storm, most of the birds flew away, but many of the smaller birds died and were found on the deck between the containers and in other protected areas of the vessel. This account was

verified. There were no sick crew members or passengers on board. This information was communicated to state public health and ATL QS officers who determined the incident to be low risk for transmitting zoonotic disease and the birds were incinerated without further testing or intervention.

B. PROBLEM STATEMENT

While this incident was not a public health emergency, it did expose major gaps in interagency communication, information sharing and collaboration for a unified response to a biological threat occurring at the Georgia seaports. In theory, disease control is the responsibility of the locale in which the disease occurs. However with globalization, the whole world may be at risk when there is a failure to effectively detect, control and respond to a disease outbreak at the local level. The probability of containing a disease of public health significance depends on how quickly the disease is detected and public health measures are implemented to limit the spread.¹ The speed of this process is directly dependent on multi-agency collaboration, communication and cooperation in detecting and responding to a microbial threat. This issue is of prime importance to homeland security because of the social and economic ramifications of a disease outbreak with high morbidity and mortality that could have been prevented or mitigated through rapid detection and response. The threat of pandemic influenza imparts urgency to this task.

This incident provided an impetus to engage in a collaborative process to strengthen relationships between the CHD/Georgia Division of Public Health (GDPH), CBP, United States Coast Guard and the CDC ATL QS. This collaboration would hopefully lead to a more effective process for detecting and responding to a microbial threat at the Georgia Ports of Savannah and Brunswick. To ameliorate the lack of interagency communication, a series of meetings were scheduled to develop a process to enhance sharing of information, establish open communication channels, clarify agency

¹World Health Organization (WHO), *Pandemic Influenza Draft Protocol for Rapid Response and Containment* (Geneva, Switzerland: World Health Organization, May 30, 2006), www.who.int/csr/disease/avian_influenza/guidelines/protocolfinal30_05_06a.pdf. [accessed February 4, 2007].

roles and responsibilities, strengthen relationships and develop a unified response to a biosecurity threat originating or occurring at the seaport.

Three months after this incident, the Institute of Medicine published a report entitled “Quarantine Stations at Ports of Entry” that verified the issues experienced in the Savannah incident were not unique, but rather reflected a national deficiency in the collaborative capacity of local, state and federal agencies with overlapping jurisdictions and responsibilities to protect the public from the threat of infectious diseases that originate abroad.² The report recognized the criticality of multi-agency sharing of information, communication and cooperation in disease detection and response at the Nation’s ports of entry to support the core mission of the CDC Quarantine Stations. This core mission is to mitigate the risks to U.S. residents posed by infectious diseases of public health significance originating abroad.³

Recommendation #2 of the report directs Quarantine Station staff to work with federal, state and local stakeholders to delineate each partner’s role, authority and channel of communication to minimize the risk of microbial threats of public health significance entering the United States.⁴ Interagency communication, information sharing and collaborative planning for a unified response provide a framework for reducing the morbidity and mortality resulting from such an event. A coordinated effort by all responding agencies is necessary to contain the disease and reduce or prevent unnecessary exposure and transmission of the illness to the public at large.

As William Pelfrey points out, collaboration and information sharing are the two predicate elements that enable multiple agencies and jurisdictions to effectively prevent incidents or mitigate their impact to the community.⁵ Hurricane Katrina response offers a vivid example of the result of poor governmental interagency collaborative planning, lack

² Laura Sivitz, Kathleen Stratton, and Georges Benjamin, *Quarantine Stations at Ports of Entry Protecting the Public's Health* (Washington D.C.: Institute of Medicine of the National Academies Press, 2006), 10. [accessed February 4, 2007].

³ Ibid., 4. [accessed February 4, 2007].

⁴ Ibid., 10. [accessed February 4, 2007].

⁵ William V. Pelfrey, "The Cycle of Preparedness: Establishing a Framework to Prepare for Terrorist Threats," *Journal of Homeland Security and Emergency Management* 2, no.1, Article 5 (2005): 11. www.bepress.com/jhsem/vol2/iss1/5/. [accessed February 4, 2007].

of cooperation and failed communications.⁶ This thesis will examine the case of interagency collaborative capacity building in the development of an alert and notification protocol for a biosecurity threat at the Georgia seaports using the diagnostic approach and framework described by Thomas et al (2006).⁷

C. RESEARCH QUESTIONS

1. Who are the key stakeholders from the public health perspective in protecting the U.S. public from the intentional or unintentional introduction of microbial threats that originate abroad?
2. What is the role of local public health in supporting the operations of the CDC Quarantine Stations?
3. How can local, state and federal agencies with jurisdictional authority and responsibility collaboratively develop an infectious disease evaluation and response protocol to reduce the risk of an infectious disease of public health significance from entering the United States?
4. How can public-private partnerships support this process?

D. LITERATURE REVIEW

1. Current Perspective

Vulnerabilities in seaport security represent a major homeland security issue that is of vital importance to the economic stability of the United States.⁸ In the aftermath of September 11, the vulnerabilities inherent in seaport security were recognized, but most funding was directed towards strengthening passenger security in the airline industry.⁹ New focus has been directed towards the challenges of securing our nation's seaports with the release of the National Strategy for Maritime Security and its eight supporting plans that address different aspects of the maritime threat and includes the International

⁶ Douglas Brinkley, *The Great Deluge, Hurricane Katrina, New Orleans, and the Mississippi Gulf Coast* (New York, NY: Harper Collins, 2006), 38. [accessed February 4, 2007].

⁷ Gail F. Thomas, Susan P. Hocevar, and Erik Jansen, *A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context* (Monterey, CA: Naval Postgraduate School), 2006, http://acquisitionresearch.org/index.php?option=com_content&task=view&id=102&Itemid=41. [accessed February 4, 2007].

⁸ *National Strategy for Maritime Security* (Washington D.C.: The White House, September 2005). www.whitehouse.gov/homeland/maritime-security.html. [accessed February 4, 2007].

⁹ Lara L. Sowinski, "A Turning Tide for U.S. Seaports," *World Trade*, 17, no. 12. (December 2004): 30. www.worldtrademag.com/CDA/Articles/Ports/653d1e36d9af7010VgnVCM100000f932a8c0. [accessed February 4, 2007].

Outreach and Coordination Strategy, the National Strategy for Maritime Security, and the National Plan to Achieve Maritime Domain Awareness.¹⁰

The International Outreach and Coordination Strategy identified human smuggling networks and bioterrorism attacks as threats to the maritime domain.¹¹ The strategy further states that a bioterrorism attack would most likely be perpetrated by a small, sophisticated group and be exceedingly difficult to detect.¹² The Central Intelligence Agency analysis agrees that a bioterrorism attack by a small, sophisticated group is a high probability event.¹³ An attack perpetrated by international crewmen during a rapid turnover port visit is a viable biosecurity threat.¹⁴ The National Plan to Achieve Maritime Domain Awareness, the National Strategy for Maritime Security and the International Outreach and Coordination Strategy consider undocumented immigration as a security threat, but fail to recognize the risk of the intentional or unintentional introduction of a disease of public health significance into the United States.¹⁵

The Maritime Transportation Security Act of 2002 establishes a framework for public-private collaboration in port security.¹⁶ This legislation mandates layered security and increased awareness of potential threats throughout the maritime domain. The goal is to improve communication, coordinate unity of effort and reduce the threat of an incident that entails a threat to U.S. security. An intentional or unintentional disease outbreak of public health significance is not mentioned in the Maritime Transportation Security Act, but definitely represents a potential biothreat to the maritime domain.

¹⁰ *National Strategy for Maritime Security*, 2.

¹¹ *International Outreach and Coordination Strategy for the National Strategy for Maritime Security* (Washington D.C.: State Department, November 2005). www.state.gov/documents/organization/64251.pdf. [accessed February 4, 2007].

¹² Ibid.

¹³ *Mapping the Global Future: Report of the National Intelligence Council's 2020 Project* (Washington, D.C.: U.S. National Intelligence Council, Central Intelligence Agency, December 2004), 20. <http://www.foia.cia.gov/2020/2020.pdf>. [accessed February 4, 2007].

¹⁴ Malcolm Dando, *Bioterrorism: What is the Real Threat?* (West Yorks, UK: Department of Peace Studies, University of Bradford, March 2005). www.bradford.ac.uk/acad/sbtwc/ST_Reports/ST_Report_No_3.pdf. [accessed February 4, 2007].

¹⁵ *National Strategy for Maritime Security; International Outreach and Coordination Strategy, National Plan to Achieve Maritime Domain Awareness* (Washington D.C.: White House, October 2005). www.dhs.gov/xlibrary/assets/HSPD_MDAPlan.pdf. [accessed February 4, 2007].

¹⁶ Maritime Transportation Security Act of 2002, Public Law 107-295, November 2002. http://www.uscgmil/HQ/G-M/MP/pdf/MTSA_S_Englebert.pdf. [accessed February 4, 2007].

The National Strategy for Maritime Security recognizes the fact that the first line of response to a Weapons of Mass Destruction (WMD) event is local responders, including medical care providers, and advocates “extensive contingency plans for response, assessment and recovery.”¹⁷ The importance of collaborative teamwork to protect people, minimize damage and expedite recovery is stated in the conclusion to this document; however, while these actions represent the expertise and role of public health capacity to respond to a WMD event the connection is notably omitted from the document.¹⁸

Most alarming is that none of these above-mentioned documents recognize the role of federal, state or local public health agencies in control and response to such an event. Furthermore, the role of public health in response to a biosecurity threat involving the seaports is not well-described in the literature and represents a gap in current knowledge.

In contrast, the National Strategy for Homeland Security recognizes bioterrorism as a viable threat, identifies the role of federal, state and local public health agencies, and promulgates the review of quarantine authorities as a major initiative.¹⁹ The National Strategy was published in the aftermath of the anthrax attacks (2001) and the Severe Acute Respiratory Syndrome (SARS) outbreak (2003), which brought these issues to the forefront. Pandemic influenza further serves as a reminder that emerging infectious diseases are a viable biosecurity threat and a critical part of the plan and therefore, must be included as a homeland security issue.²⁰

The U.S. Public Health Service, of which the CDC Division of Global Migration and Quarantine is a part, has statutory and regulatory responsibility to prevent the introduction, transmission, and spread of communicable disease from foreign countries

¹⁷ *National Strategy for Maritime Security*, 14.

¹⁸ *Ibid.*, 25.

¹⁹ *National Strategy for Homeland Security* (Washington D.C.: White House, July 2002), 49. www.whitehouse.gov/homeland/book/. [accessed February 4, 2007].

²⁰ Meredith Cohn, "Border Security Tightened as Precaution to a Pandemic," *Baltimore Sun*, January 8, 2006. <http://www.montereyherald.com/mld/montereyherald/living/health/13578805/13578805.htm>. [accessed January 10, 2006].

into the United States.²¹ The quarantine program was very strong in the early 1900s and virtually all travelers arriving at a U.S. seaport were met and screened for communicable diseases by a Marine Hospital Service officer. When responsibility for the quarantine program was transferred to the CDC in 1967, quarantine stations were located at every port, international airport and major border crossing in the United States. With the eradication of smallpox in the 1970s, the CDC reduced the size of the quarantine program and changed its focus from routine inspections to program management and problem intervention.²² By the year 2004, the number of quarantine stations was reduced to eight and were charged with serving the entire nation. The SARS outbreak in 2003, underscored the need for a rapid response to emerging infectious disease threats from foreign sources. During this outbreak, CDC encountered difficulties in tracking persons who may have been exposed to an ill international traveler. New federal regulations are pending that would update 42 Code of Federal Regulations (CFR) Parts 70 and 71 to require airlines and shipping industries to keep electronic copies of passenger manifests for sixty days with required release to health officials investigating possible exposure to diseases of public health significance. The CDC recently implemented a plan to expand the number of quarantine stations. Currently, there are eighteen stations nationwide with plans to expand the number to twenty five to cover the nation's 474 major ports of entry.²³

The Quarantine Station serving the Georgia Ports Authority is located in Atlanta, Georgia and is responsible for international arrivals in Georgia, North Carolina, Arkansas, South Carolina, Tennessee, Alabama, Mississippi, and Louisiana.²⁴ Federal isolation and quarantine is authorized for nine communicable diseases: cholera, diphtheria, tuberculosis, plague, suspected smallpox, yellow fever, viral hemorrhagic

²¹ *Public Health Screening at U.S. Ports of Entry: A Guide for Federal Inspectors* (U.S. Department of Health and Human Services, Public Health Service, March 2000), 2. www.cdc.gov/ncidod/dq/pdf/hguide.pdf. [accessed February 4, 2007].

²² *History of Quarantine* (Centers for Disease Control and Prevention), <http://www.cdc.gov/ncidod/dq/history.htm>. [accessed February 4, 2007].

²³ *Control of Communicable Disease Proposed 42 CFR Parts 70 and 71* (Centers for Disease Control and Prevention, Division of Global Migration and Quarantine). www.cdc.gov/ncidod/dq/nprm/. [accessed February 4, 2007].

²⁴ *Quarantine Stations* (Centers for Disease Control and Prevention). www.cdc.gov/ncidod/dq/quarantine_stations.htm. [accessed February 4, 2007].

fevers, SARS, and novel influenza.²⁵ Obviously, international travelers do not arrive with an attached diagnostic label, making screening procedures vital to detection and response.²⁶ Also obvious, CDC quarantine officers are not immediately available to provide medical evaluation for travelers with signs and symptoms of illness, making reporting procedures vital for appropriate intervention.²⁷

Federal and state laws overlap in jurisdiction and authority once an international carrier arrives in the United States, leading to some confusion over the role of each agency.²⁸ Preservation of the public health is the responsibility of state and local agencies, but response to an infectious disease event requires communication and collaboration among local, state and federal entities with jurisdictional responsibility for the containment.²⁹ Primary quarantine authority is a function of state health officials, but the federal government exercises authority over interstate and foreign quarantine.³⁰ Challenges evident in the quarantine process led to the Department of Health and Human Services proposing to update the Code of Federal Regulations 42 CFR Parts 70 and 71 to strengthen the capacity to enforce regulations.³¹

Gaps, barriers and shortfalls are evident in the current legislative and practice arena for isolation and quarantine, screening procedures, and reporting process for communicable diseases at the nation's seaports.³² Understanding these gaps, barriers and shortfalls are the first step in the collaborative development of interagency best practices to effectively address biosecurity threats at the Georgia Ports.

²⁵ *Legal Authorities for Isolation and Quarantine* (Centers for Disease Control and Prevention). www.cdc.gov/ncidod/dq/quarantine.htm#2. [accessed February 4, 2007].

²⁶ *Public Health Screening at U.S. Ports of Entry*, 3.

²⁷ *Ibid*, 3.

²⁸ Angie Welborn, *Federal and State Quarantine and Isolation Authority* (Washington D.C.: Congressional Research Service, January 18, 2005), 6. www.fas.org/sgp/crs/RL31333.pdf. [accessed February 4, 2007].

²⁹ Sivitz, Stratton and Benjamin, *Quarantine Stations at Ports of Entry Protecting the Public's Health*, 4.

³⁰ Welborn, *Federal and State Quarantine and Isolation Authority*, 2.

³¹ *Control of Communicable Disease Proposed 42 CFR Parts 70 and 71*.

³² Sivitz, Stratton and Benjamin, *Quarantine Stations at Ports of Entry Protecting the Public's Health*, 14.

2. Interagency Collaboration in Homeland Security

Many of the federal guidance and strategy documents related to homeland security, recognize that no single governmental agency has the capacity, skills or resources to respond to every threat and propose that interagency collaboration is a critical component of preparedness to achieve optimal information sharing, communication and cooperation. The Introduction of the National Strategy for Homeland Security states that a comprehensive strategy based on the principles of cooperation and partnership will enhance our protection and reduce our vulnerabilities to terrorist attacks. The strategy calls for integrated information sharing and improved communication systems across governmental agencies, within levels of government and with the private sector to optimize security for a better, stronger and safer America.³³ Pelfrey noted that information sharing can occur with greater ease, frequency, reliability, and validity, if collaboration has been practiced.³⁴ However, the response to Hurricane Katrina provides evidence of the lack of progress since September 11, 2001, in governmental interagency collaborative planning, cooperation and communication in development of a seamless response to a catastrophic event.³⁵

The criticality of a coordinated, unified response is well-recognized and the directive to develop collaborative capacity has been given, but little guidance has been offered in the successful establishment of collaborative systems.³⁶ Collaborative capacity is defined as the ability of organizations to enter into, develop and sustain inter-organizational systems in pursuit of collective outcomes.³⁷ The model described by Thomas et al is a readiness assessment that can be used by organizations to define and

³³ *National Strategy for Homeland Security*, 2.

³⁴ Pelfrey, "The Cycle of Preparedness," 9.

³⁵ Scott E. Robinson, Britt Berrett, and Kelley Stone, "The Development of Collaboration of Response to Hurricane Katrina in the Dallas Area," *Public Works Management & Policy* 10, no. 4 (April 2006): 315. <http://pwm.sagepub.com/cgi/content/abstract/10/4/315>. [accessed February 5, 2007].

³⁶ Susan Hocevar, Eric Jansen, and Gail Thomas, *Building Collaborative Capacity for Homeland Security* (Monterey, CA: Naval Postgraduate School, 2004), 1. [accessed February 5, 2007].

³⁷ Thomas, Hocevar, and Jansen, "A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context," 2.

improve their collaborative capacity.³⁸ The model describes enablers and barriers to interagency collaboration and provides a framework for case study analysis using organizational design components that include purpose and strategy, structure, lateral mechanisms, incentives and people.³⁹

³⁸ Thomas, Hovevar, and Jansen, "A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context," 3.

³⁹ Ibid., 6.

II. THE COLLABORATIVE PLANNING PROCESS

A. MODEL OF COLLABORATIVE CAPACITY

In response to the clearly defined need for teamwork, information sharing and collaboration in the Department of Homeland Security preparedness initiatives, Thomas and others embarked upon research to describe the successful interagency collaborative process. The goal of their research was to build a foundation of relevant knowledge concerning inter-organizational collaboration that would assist local, state and federal officials in the management of activities related to homeland security.⁴⁰ Part of their research process included the design of an action-based workshop to gather data from thirty senior homeland security professionals enrolled in the Masters in Homeland Security course at the Naval Postgraduate School in 2004, thus providing real insights into the challenges faced by governmental agencies in pursuit of improved collaborative capacity for a seamless response.⁴¹ The results from this workshop were used by the researchers to describe factors that explain success (enablers) and barriers that deter effective collaboration.

Information sharing, cooperation, open communication and collaboration are current homeland security buzzwords, yet many collaborative planning efforts achieve less than optimal results or even fail in the attempt. Eugene Bardach describes collaboration as an unnatural process committed by non-consenting adults.⁴² Barriers to successful collaboration include mission diversity, conflicting goals and incentives, distrust among agencies, lack of administrative support and the lack of coordination systems and structures to support the efforts.⁴³ Thomas and others used a “force field” analysis model developed by Lewin to provide a framework for examining the enablers

⁴⁰ Thomas, Hovevar, and Jansen, "Building Collaborative Capacity for Homeland Security," 1.

⁴¹ Ibid.

⁴² Eugene Bardach, *Getting Agencies to Work Together: The Practice and Theory of Managerial Craftsmanship* (Washington D.C.: Brookings Institution Press, 1998), 263.

⁴³ *Management Challenges Facing Federal Leadership*, (Washington D.C.: US Government Accountability Office, Homeland Security, GAO-03-260, December 2002). www.gao.gov/text/d03260.html. [accessed February 5, 2007].

and barriers to successful collaboration.⁴⁴ This model introduces the concepts of “driving forces” and “restraining forces” to explain the dynamics of change. To increase collaborative capacity, an organization must strengthen its “driving forces,” or enablers, to overcome “restraining forces,” or barriers, to the process.⁴⁵

The Collaborative Capacity Model uses five components of organizational design to identify the enablers or “driving force” factors and barriers or “restraining forces” that inhibit collaborative capacity.

1. The **structural component** refers to having the right people at the collaborative table; people who have the power and authority to engage in the process with no impeding rules or policies of the participating agencies.
2. The **people component** focuses on the innate characteristics of the participants to appreciate others’ perspectives, and build trust, commitment and motivation.
3. **Lateral mechanisms** are described as effective communication and information sharing used to build a social network. Barriers to building this social network are distrust of others as evidenced by inadequate communication and information sharing and lack of familiarity with the mission, goals and objectives of the other participating agencies.
4. The **purpose and strategy component** refers to having a reason to embark upon the collaborative process by having a commonly perceived threat or goal that meets the interests of each participating agency.
5. The **incentives component** refers to the payoff or benefit that each agency receives by participating in the collaborative process.⁴⁶

This model will be used to analyze the successful collaborative partnership at the Georgia seaports to determine how well it describes the actual process in an attempt to validate or dispute the constructs of the model. The model will be used to describe and classify the factors that served as enablers or barriers to the collaborative process and the development of the Shipping Agent Survey, a vendor-generated syndromic surveillance

⁴⁴ Thomas, Hocevar, and Jansen, "A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context," 5.

⁴⁵ Ibid.

⁴⁶ Thomas, Hocevar, and Jansen, "A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context," 6.

system (FirstWatch®, Stout Solutions, Salinas, CA) for the Port of Savannah and the Infectious Disease Evaluation and Response Plan at the Georgia Ports, which were the products of this successful initiative.

B. STRUCTURAL COMPONENT

A successful structural component of the Collaborative Capacity Model is characterized by team members with formal power and authority engaged in the collaborative planning process.⁴⁷ The need to identify the appropriate internal and external stakeholders in protecting the U.S. public from an intentional or unintentional introduction of microbial threats that may be introduced from abroad was accomplished on November 2, 2005, when CHD and CBP staff met to complete an after action report regarding the Savannah Port incident. It was agreed that communication channels and interagency relationships needed clarification and improvement. The U.S. Coast Guard (USCG), ATL QS and GDPH staff were identified as key stakeholders in the planning process in preventing the introduction of a biothreat through the port but were not present.

At a follow-up meeting held on November 9, with these stakeholders present, it was agreed that a collaborative response protocol geared to strengthening interagency relationships, clarifying communication channels and leading to a more unified response was critical. The participants held administrative positions with subject matter expertise and authority to make administrative decisions for their agency and formed the core work group in the collaborative planning process.

Identification and inclusion of other stakeholders emerged as the collaborative planning process progressed over the next year. Emergency Medical Services (EMS), Emergency Management Agency, hospital safety and infection control, the Federal Bureau of Investigation, law enforcement, Savannah Maritime Association and port industry staff were invited to participate in the planning process (see Figure 1). Regional interest developed and the group expanded to include stakeholders from the Ports of Charleston and Mobile (See Appendix 2 for a list of all participating agencies).

⁴⁷ Thomas, Hocevar, and Jansen, "A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context," 7.

Port industry and vessel services personnel including shipping agents, stevedores and Port Authority staff were identified as having a vital role in the early detection of a biothreat among international travelers and having responsibility for rapid notification to the appropriate government agency. Vessel masters originate from various regions throughout the world and visit numerous ports during their voyage, but the sheer numbers preclude any meaningful relationship, training or partnership opportunities. Vessel ownership may be foreign and depend upon contractual services with local shipping agents. The shipping agents are the most likely point of contact for ill crew members requiring healthcare services because they provide vessel services, represent a local entity and possess knowledge of the health status of international crewmen on the vessel. The shipping agent responsible for cargo vessel services would typically receive notification from the master before arrival of the vessel in the event of a sick crewman or a disease outbreak. This relationship clearly places shipping agents in a unique position as a valuable partner in disease surveillance and control efforts over other port industry entities. Therefore, collaborative public-private partnerships with port industry organizations would enhance the likelihood of prompt detection and rapid notification, and promote an effective response to a biological threat at the Georgia Ports of Savannah and Brunswick.

In summary, enablers to the establishment of a viable structure for the interagency collaborative group included prompt identification of the essential, primary stakeholders including shipping industry, healthcare entities, law enforcement, state and local public health, ATL QS, CBP and USCG. The importance of improving the collective response to an infectious disease threat prompted each agency to send a staff member with the authority and expertise to make definitive decisions regarding response procedures, thus providing the right people at the collaborative table. The resultant interactions and communications gradually led to the identification and inclusion of the expanded group of stakeholders in the collaborative planning process.

Conversely, the expanded group of stakeholders actually became a barrier to effective development of the final products. The group size prevented an effective

dialogue. To address the challenge, the expanded work group agreed that each core agency should appoint a subject matter expert to work in a small group to refine the final products that were under development.

Barriers to the structure of the collaborative process also included the difficulties inherent in the engagement of the shipping agents in a public-private partnership to improve the disease reporting process. While the private sector is focused on protecting economic interests in terms of the provision of services, commodities and jobs, the government entities are focused on protecting and promoting public welfare. This diametrically opposed focus suggests that engagement with the private sector requires sensitivity to the private sector economic considerations when initiating and developing public-private collaborations. Private partners are unlikely to respond positively if economic barriers are created as a result of their cooperative efforts. Industry benefits of collaboration to detect, prevent, respond and mitigate infectious disease events were clearly articulated in making the case to develop protocols for enhanced information sharing and implemented disease control measures that minimize the impact on the workforce.

Building alliances with port industry through the Savannah Maritime Association fostered a unified, collaborative initiative to improve communication and information sharing. It also provided a venue to engage the members in planning and policy development. The Savannah Maritime Association is a member of the Area Maritime Security Committee with a membership that encompasses port industries and local, state and federal governmental agencies with jurisdictional responsibility for the Georgia ports. The association's participation in the process increased cooperation and improved outcomes. Institutionalization of policies and maintenance of long-term relationships was a benefit of public health's membership in the Savannah Maritime Association. Meetings provided a venue to increase biological threat awareness, raise concerns, share information, discuss options and collaboratively address gaps and barriers in the planning process.

The structural component that provided inputs, or resources, into the collaborative planning process is illustrated in Figure 1. This figure will be utilized throughout this

discussion to illustrate and clarify the progression from inputs into the collaborative process through the production of outputs that lead to the desired outcomes of healthy people and a healthy community.

Biological Threat Detection and Control

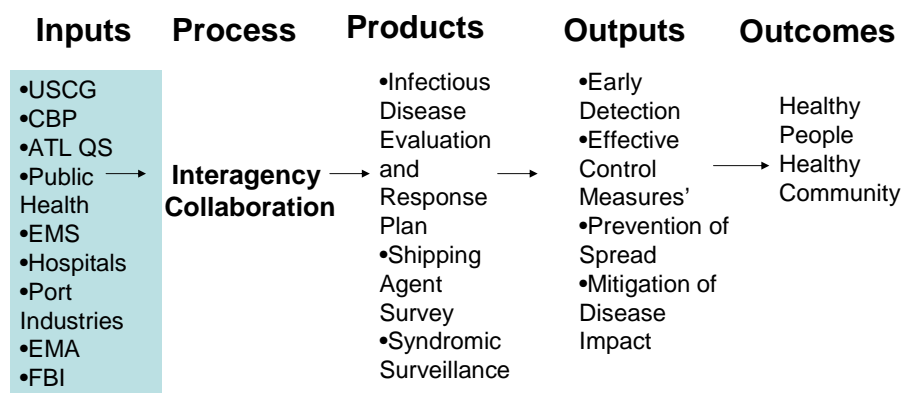


Figure 1. Biological Threat Detection and Control: Inputs, Determining the Structural Component

C. LATERAL MECHANISMS

The Collaborative Capacity Model describes lateral mechanisms as the social capital and communication that develops from human interaction. Effective communication results from the increased familiarity and interpersonal network formation that develop as people spend time together in repeated interactive encounters. Barriers to the “lateral mechanism” are described as a lack of familiarity with other organizations and inadequate information sharing and communication.⁴⁸

⁴⁸ Thomas, Hocevar, and Jansen, "A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context," 7.

This lack of familiarity was noted as a barrier to the planning process at the November 9, 2005, meeting when the core stakeholders came to a consensus that they were unfamiliar with the mission of the other agencies missions, jurisdictions and daily operating procedures. During that meeting, each agency gave a general overview to clarify organizational mandates and to ensure understanding of how agencies could work collaboratively to improve a collective response. The understanding gleaned from that meeting was deemed so valuable to the core work group that a decision was made to share the information at a large educational meeting for local public health and health care community, CBP and USCG staff held in January 2006. The following is an overview of the role of each core agency provided by that organization in disease detection, notification, and implementation of prevention and control measures.

1. Atlanta Quarantine Station (ATL QS)

The Secretary of the Department of Health and Human Services has statutory responsibility for preventing the introduction, transmission, and spread of communicable diseases in the United States. Under its delegated authority, the CDC Division of Global Migration and Quarantine works to fulfill this responsibility through a variety of activities, which include the operation of Quarantine Stations at ports of entry, establishment of standards for medical examination of persons destined to permanently reside in the United States, and administration of interstate and foreign quarantine regulations that govern the international and interstate movement of persons, animals, and cargo. Foreign students, visitors and temporary workers are not included under the medical examination standards for entry into the United States. The legal foundation for these activities is found in Titles 8 and 42 of the U.S. CFR and relevant supporting regulations.⁴⁹ The ATL QS has operational jurisdiction with authority to detain, medically examine or conditionally release individuals believed to be carrying a communicable disease of public health significance.⁵⁰ The ATL QS has four staff members and bears primary responsibility in identifying and responding to human health risks arriving at all ports of entry in Georgia, Alabama, Arkansas, Louisiana, Mississippi,

⁴⁹ 42 CFR Parts 70 and 71. <http://www.cdc.gov/ncidod/dq/lawsand.htm>. [accessed February 5, 2007].

⁵⁰ Ibid.

North Carolina, South Carolina and Tennessee. Therefore, the obligation to report ill passengers or crew resides with vessel masters. Compliance with reporting regulations is often sporadic.⁵¹ Vessel masters are mainly concerned with keeping the vessel engaged in commerce and avoiding any delays at port. For this reason, vessel masters may not comply with mandatory disease reporting procedures.

Additionally, there is a great deal of variation in disease reporting compliance between ports. This is often a reflection of how recently the port was visited by the Quarantine Officer and education provided on the reporting requirements. Educating all stakeholders is difficult because of the magnitude of numbers of international vessels and shipping agents. The Quarantine Officers often rely on local/state public health response to incidents because the Quarantine Station is generally located at a distance from the port. In addition, CDC Quarantine Stations develop Memorandums of Understanding signed with local hospitals to receive and treat international travelers with diseases subject to a quarantine order.⁵²

2. Coastal Health District, Georgia Division of Public Health

The GDPH is an agency of the Georgia Department of Human Resources and is the lead agency entrusted by the people of the State of Georgia with the ultimate responsibility for the health of communities and the entire population. The vision of the GDPH is a Georgia with healthy people, families, and communities, where all sectors unite by pooling their assets and strengths to promote health for all. Decisions are made in harmony with economic and environmental concerns.⁵³ The GDPH provides leadership to each of the 18 health districts in Georgia to promote, protect and improve the health and safety of the people.

The CHD is entrusted by the State of Georgia with the responsibility for the health of the community, which consists of Bryan, Camden, Chatham, Effingham, Glynn,

⁵¹ David Kim (Medical Officer, CDC Atlanta Quarantine Station), "Overview of Quarantine Station Medical Operations," Presentation at the Port of Savannah, January 25, 2006.

⁵² Terrence Daley (Chief Quarantine Officer, CDC Atlanta Quarantine Station), "Overview of Quarantine Station Operations," Presentation at the Port of Savannah, January 25, 2006.

⁵³ Georgia Division of Public Health, "Mission and Vision," <http://health.state.ga.us/visionmission.asp>. [accessed February 5, 2007].

Liberty, Long and McIntosh Counties.⁵⁴ The district and county public health staff work under the direction of the District Health Director who serves as the Chairman of the Board of Health in every county served. The mission of the CHD is to ensure conditions in which people can be healthy and to provide leadership in the prevention of disease and injury. The CHD bears primary responsibility for the management and monitoring of individuals with a disease of public health significance once crew members disembark from an international vessel at Georgia seaports and for the protection of the community against such a threat.

3. U.S. Coast Guard (USCG) Marine Safety Unit of Savannah

The USCG Marine Safety Unit of Savannah has jurisdiction from the Port of Savannah in Chatham County to the southern border of Naval Kings Bay Submarine Base in Camden County. The USCG is responsible for all port security measures, which include activities of targeted boarding teams, pollution and all hazards response, vessel and crew inspections, investigation of maritime casualties, revocation of mariners' documents, intelligence team investigations, contingency planning, enforcement of vessel quarantine orders, and general safety and security of the Georgia seaports. Every vessel in a U.S. seaport is subject to control by the federal government in so far as this control is directed toward verifying that the vessel is in compliance with international maritime conventions and U.S. law. The 33 CFR § 6.04-8 gives the Captain of the Port the authority to "control the movement of any vessel within the territorial waters of the United States under his jurisdiction, whenever it appears to him that such action is necessary in order to secure such vessel from damage or injury, or to prevent damage or injury to any vessel or waterfront facility or waters of the United States".⁵⁵ The USCG may also assist in transporting medical services to vessels to evaluate sick persons.

⁵⁴ Coastal Health District Homepage. www.gachd.org. [accessed February 5, 2007].

⁵⁵ Marine Exchange of Alaska Homepage. <http://www.mxak.org/regulations/33CFR/33cfr6.01.htm>. [accessed February 4, 2007].

4. United States Customs and Border Protection (CBP)

The CBP is an agency of the Department of Homeland Security and bears responsibility for border protection and security. CBP enforces all laws and regulations of the U.S. federal government related to importation, exportation, traveler admissibility issues and immigration policies. The Port of Savannah is a cargo seaport and containers are risk-rated in accordance with the Container Security Initiative.⁵⁶ The most common violations noted in Savannah are narcotics, trade violations, pre-cursor chemicals, food items and stowaways. CBP is tasked with the responsibility of ensuring that crewmen are eligible for admission into the United States as well as detecting if there are any travelers with illnesses that may be of public health significance.⁵⁷ Most vessels arriving in Savannah are from Asia increasing the potential introduction of a novel strain of avian influenza or some other newly emerging or reemerging infection that is circulating in that part of the world. The usual passage from Asia is two to four weeks, but crewmen may join the vessel at any port, which increases the potential that a disease may still be in the incubation phase with no signs of infection until the crewman has arrived in the United States. Crewmen are of many nationalities, which increase the potential risk of the introduction of novel infections from diverse sources.⁵⁸

In summary, enablers to the lateral mechanism included the interest and value placed upon learning the roles, responsibilities and daily operation of each core agency. Therefore from the barrier characterized by the lack of understanding and knowing the organizational mandates, regulations and mission of each agency identified at the November 9 meeting, an enabler to the social network of the stakeholders was created by educating and understanding one another. At the January 2006 education meeting, the benefits of understanding each agency's regulatory requirements and of forming an interagency relationship were broadened to the operational staff level.

⁵⁶ U.S. Customs and Border Protection, "CSI: Container Security Initiative," www.cbp.gov/xp/cgov/border_security/international_activities/csi/. [accessed February 5, 2007].

⁵⁷ Annette Coppola (Supervisory CBP Officer, Presentation at the Customs House, Savannah, Georgia) November 9, 2005.

⁵⁸ Ibid.

D. PURPOSE AND STRATEGY

Thomas et al describe purpose and strategy as driven by a commonly perceived risk, threat, or goal resulting in a shared purpose and willingness to adapt the collaborative effort to the interests of other participating agencies.⁵⁹ The dead bird incident provided a purpose to initiate the collaborative process and underscored the need for a unified mechanism to support decision making and information sharing. Each of the stakeholders recognized the existing confusion regarding jurisdictional roles and responsibilities of the other agencies in response to a biosecurity threat at the seaport and the existing gaps and barriers in the process that the incident made evident. In addition, the threat of pandemic influenza provided an urgent need to address these issues.

Compliance with disease reporting regulations for governmental and private industry workers is challenging in several respects:

- Identification of all stakeholders involved was not initially known.
- Knowledge of the mandates, regulations and mission of each stakeholder was not known.
- Vessel masters, port industry and governmental workers may have been unaware of disease reporting regulations.
- Straightforward notification policies, protocols and procedures to facilitate reporting were not in place.
- Confusion existed over which agency to notify and what circumstances should be reported.
- Workers lacked training to recognize, detect, report and respond to naturally occurring or bioterrorism disease events.
- Workers lacked expertise in identifying high-risk health issues that demand urgent public health intervention.
- Education of all stakeholders was difficult because so many different entities from both the private and public sector were involved.
- Economic pressures to keep commerce moving and avoiding any delays in port were barriers to reporting uncertain circumstances.

The purpose and strategy of the interagency collaborative planning process was to address and begin to solve these identified challenges by developing partnerships and team group as illustrated in Figure 2.

⁵⁹ Thomas, Hocevar, and Jansen, *A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context*, 7.

Biological Threat Detection and Control

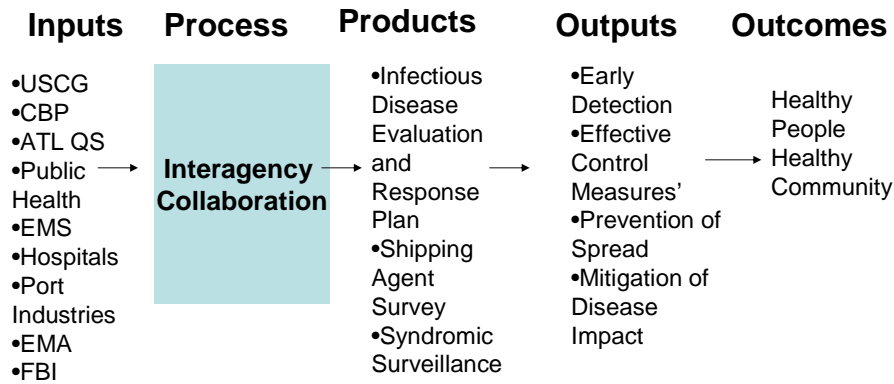


Figure 2. Biological Threat Detection and Control: Process; Working with Stakeholder Agencies to Develop Interagency Collaboration

Interactive analysis of response to the dead bird incident and a review of agency roles led to the identification of the following areas described as strengths, weaknesses, opportunities and threats (SWOT) as shown in Figure 3. Strengths included the existence of federal and state regulations that provide jurisdictional authority for efforts to detect and respond to incidents and the collective expertise of the group and willingness of the stakeholders to participate in collaborative planning. Weaknesses were identified as not having Quarantine Officers stationed in Savannah to screen and respond to incidents, and the lack of clear procedures, policies, training and awareness among stakeholders, particularly port industry workers. The threats included unacceptable delays in commerce that result in economic losses and jurisdictional squabbles related to overlapping responsibilities. These threats were identified as barriers to the development of public-private partnerships in a collaborative protocol. The opportunities to create new partnerships, improve information sharing, and enhance surveillance for early detection and implementation of effective disease control interventions was seen as an exciting prospect to overcome existing weaknesses and barriers.

Strengths <ul style="list-style-type: none"> ▪Existence of state and federal regulations ▪Collaborative partnership to address issues ▪Collective Expertise 	Weaknesses <ul style="list-style-type: none"> ▪QS staff not in local area ▪Stakeholders unaware of regulations ▪Straightforward policies not in place ▪Confusion over what and how to report <p>* QS, Quarantine Station</p>
Opportunities <ul style="list-style-type: none"> ▪Enhanced surveillance ▪Multi-agency and public-private partnerships ▪Information sharing ▪Early detection and effective disease control 	Threats <ul style="list-style-type: none"> ▪Commerce ▪Economic barriers ▪Jurisdictional challenges

Figure 3. Strength, Weaknesses, Opportunities Threats (SWOT) Analysis (After Strategic Planning for Public and Nonprofit Organizations)

The SWOT analysis clarified the purpose and strategy for collaborative planning summarized in the four action framework shown in Figure 4 and guided the process for protocol development. In this framework, priorities to reach the desired outcome of healthy people and a healthy community were identified. These priorities included the reduced response time of public health to detect, intercept and mitigate a potential biothreat to the community. This would occur through new partnerships, protocols for notification, training opportunities for all stakeholders and unified efforts resulting in improved awareness, information sharing, communication, cooperation and surveillance. The result of these efforts would eliminate confusion, barriers to information sharing and seams in the process.

Public-Private Partnerships in Disease Control at the Port

Four Actions Framework

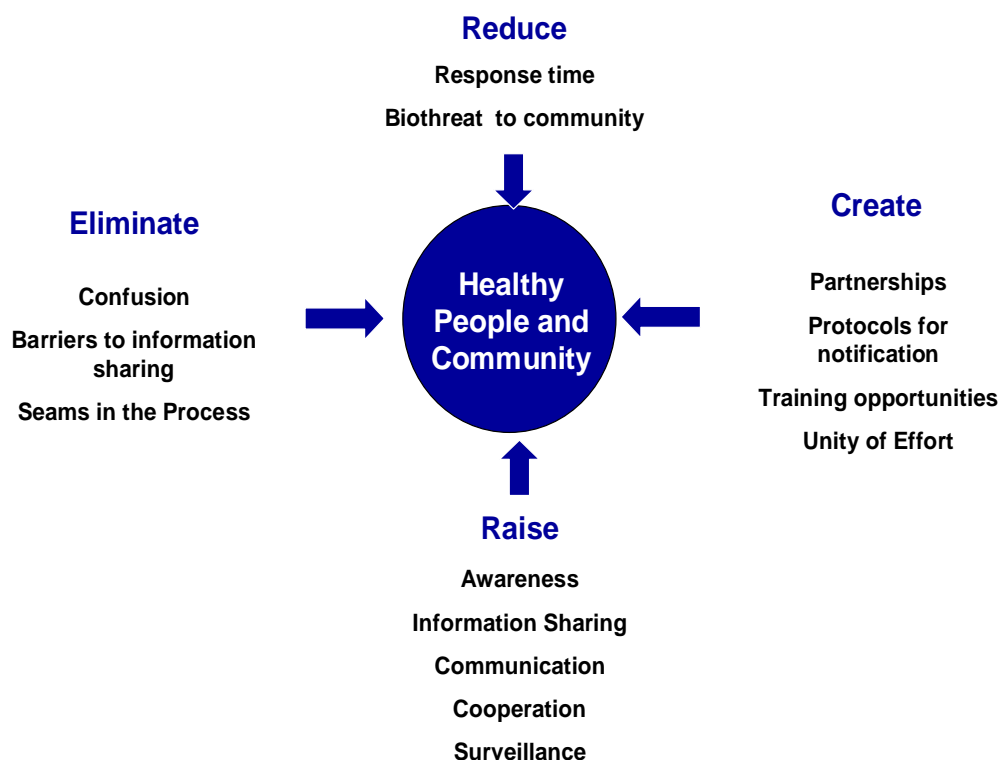


Figure 4. Public-Private Partnerships for Disease Control (After Blue Ocean Strategy)

E. PEOPLE COMPONENT

An important component for successful collaboration is that people involved in the process had the ability to appreciate others' interests and views, and to build trust, commitment and motivation among themselves.⁶⁰ All of the core work group members exhibited a high degree of respect and appreciation for the professionalism and expertise of the other members and were highly motivated to participate in this process due to the benefits that could be achieved through a seamless, coordinated and timely process and the impact of a failed response.

⁶⁰ Thomas, Hocevar, and Jansen, *A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context*, 8.

The Ports of Savannah and Brunswick are located in Chatham and Glynn Counties, respectively. Protocol development and approval from local responders outside of public health were achieved through a series of meetings that included Emergency Management Agency, EMS, hospital, law enforcement, and local Federal Bureau of Investigation personnel.

As the group grew in scope, meetings became harder to facilitate and manage until it was decided to reduce the work group to the core agencies to maintain effectiveness. The final products were developed and presented to the larger stakeholder group for final approval. The larger stakeholder group primarily represented Chatham County (Savannah) agencies while the core work group consisted of agencies with regional jurisdiction for the coastal region of Georgia. The scope of the Infectious Disease Evaluation and Response Plan was regional with applicability to the Port of Brunswick and required buy-in from agencies serving Glynn County.

In Glynn County, the protocol was presented at a specially called meeting held in November 2006, which included all local players. The protocol was approved after discussion and notation of the unique variances at this locale. The Port of Brunswick includes terminals that are located within the City of Brunswick and Glynn County. Either county or city EMS may respond to a 911 call. Southeast Georgia Health System Brunswick Campus developed a Seafarers' Program in 2002 that provided quick and easy access to medical care for crewmen on international vessels. The Health System offered medical support as an adjunct to this program that would mobilize to any port response incident and would be activated at the request of public health. The program established a mechanism for rapid triage in the Emergency Department so that the crewman could receive treatment and return to the vessel before the scheduled departure.

Extending applicability of the protocol to the Port of Charleston was facilitated by the participation and contribution of the Health Director of the Trident Health District, South Carolina Department of Health and Environmental Control (DHEC). DHEC was simultaneously developing an infectious disease protocol for South Carolina and decided to work collaboratively with the group from Savannah to achieve a regional product. The ATL QS also had a strong interest in a regional protocol to standardize the process within

their jurisdictional area. The Marine Safety Unit of Savannah is part of Sector Charleston, which simplified USCG participation in the regional expansion of the protocol.

The willingness of the core work group to seek input from the local stakeholders and to encourage them to adjust the procedure to meet local requirements was an enabler to the collaborative process. Each locale had different agency structures with variations in the local norms for emergency preparedness. This openness demonstrated respect and confidence for the people and agencies in each locale, while maintaining a consistent framework for response across the region.

Another challenge was in the area of establishing the Incident Command Structure (ICS). The group decided upon a Unified Command Structure (UC) to manage the incident, but the mechanism for actually achieving this objective was ambiguous. Challenges also included the fact that ATL QS staff was located in Atlanta and therefore, the UC would initially be established by conference call. UC would be established at the Emergency Operation Center (EOC) under the jurisdiction of the Emergency Management Agency in the affected county, should the incident exceed the scope or jurisdiction of the core agencies.

Communication channels and flow of agency notification were other significant challenges. Communication flow between local, state and federal agencies was a topic of much discussion. The ATL QS staff depend on CBP and local health officials to provide on-scene evaluation and response. Normal communication flow is from local to state to federal levels, yet the initial flow may be from federal to local as the incident unfolds. An ambiguity exists if federal agencies communicate directly with local agencies for incident management. This ambiguity was addressed through open dialogue and solved by the directive for immediate notification of all core agencies for any level of activation.

A variation of the communication flow issue resurfaced as a result of the shipping agents survey findings that indicated port industry members would prefer to communicate directly with USCG officers for any suspicion of illness among crewmen. This was not in alignment with the federal regulations that require direct notification to the ATL QS. Port industry officials may be more willing to comply with disease

reporting if encouraged to contact those with whom they are most comfortable communicating. Educational efforts for port industry will encourage direct contact with the ATL QS, in compliance with regulations.

Facilitation of the discussions surrounding these and other issues required openness, honesty, trust and respect for others' opinions and the mission and roles of each agency. A democratic leadership style of the members of the core work group contributed to the success of this collaborative initiative through consensus building. Leadership for this process was provided by each of the core agencies involved, but public health provided the organizational framework for the process. The main barrier to the people factor was due to the numbers of agencies involved in the response to a biosecurity incident and applicability to different locales.

F. INCENTIVES

There must be some “payoff” or incentive to motivate each agency to invest, support and commit to the successful collaborative planning process.⁶¹ Each of the core agencies recognized the benefits and opportunities that could be achieved through collaborative partnerships for a unified response. Forging new public-private partnerships that included local, state, and federal resources would improve disease detection, multi-agency and multi-jurisdictional communication and notification, information sharing, decreased response time, increase effectiveness of control measures, reduced transmission rates, provide appropriate medical care for ill persons, reduce impact to the workforce, improve public safety and increase situational awareness of biosecurity (see Figure 5). Data sources for expanded syndromic surveillance were investigated as a public health method to increase the likelihood of detection of infectious diseases among travelers and mitigate the spread of the disease. The value and benefits that were achieved through new partnerships and a collaborative, unified response is shown graphically in Figure 5.

⁶¹ Thomas, Hocevar, and Jansen, *A Diagnostic Approach to Building Collaborative Capacity in an Interagency Context*, 7.

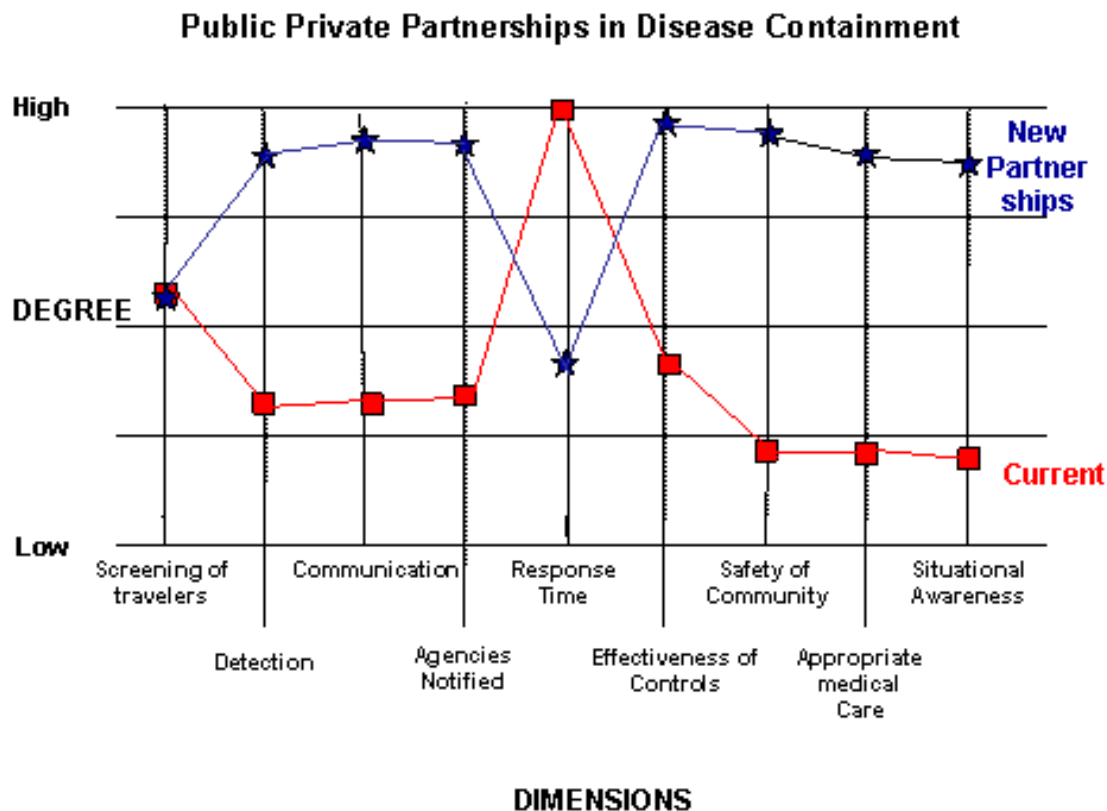


Figure 5. Value Curve Analysis for Partnerships (After Blue Ocean Strategy)

Outputs of the collaborative planning process included the development of the following products to improve disease detection, response, control and mitigation of the impact on the community.

- Survey of the attitudes, knowledge and practice of shipping agents in response to a crewman who is ill.
- Development and implementation of geo-cluster syndromic surveillance for EMS dispatches to the Port of Savannah.
- Infectious Disease Evaluation and Response Plan at the Georgia Seaports

These products are described in the following chapter. They hopefully provide a mechanism to achieve early disease detection, and effective containment, prevention and

mitigation of the impact from the emerging or reemerging infections from international sources on the community, with the ultimate outcome of healthy people, healthy workforce and a healthy community.

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III. PRODUCTS

The priorities that were established by the core work group included reduced response time of public health to detect, intercept and mitigate a potential biothreat to the community through creating new partnerships, protocols for notification, training opportunities for all stakeholders and unified effort. These priorities were translated into the production of a survey of shipping agents to determine their attitudes, knowledge and practice in response to a crewman who is ill; development and implementation of geo-cluster syndromic surveillance for EMS dispatches to the Port of Savannah; and development of the Infectious Disease Evaluation and Response Plan, as illustrated in Figure 6. Deployment of these products will hopefully eliminate confusion, barriers to information sharing and seams in the process of biological threat detection, interception, and mitigation through heightened situational awareness, communication, surveillance and coordinated, collaborative response. A detailed description of these products is included for consideration of the applicability to other communities with cargo seaports. The Infectious Disease Evaluation and Response Plan is included in its entirety and is offered as a starting point for local health departments and other stakeholders engaged in collaborative initiatives with their state and federal partners. This plan delineates each partner's role, authority and channel of communication in minimizing the risk of microbial threats of public health significance entering the United States.

Biological Threat Detection and Control

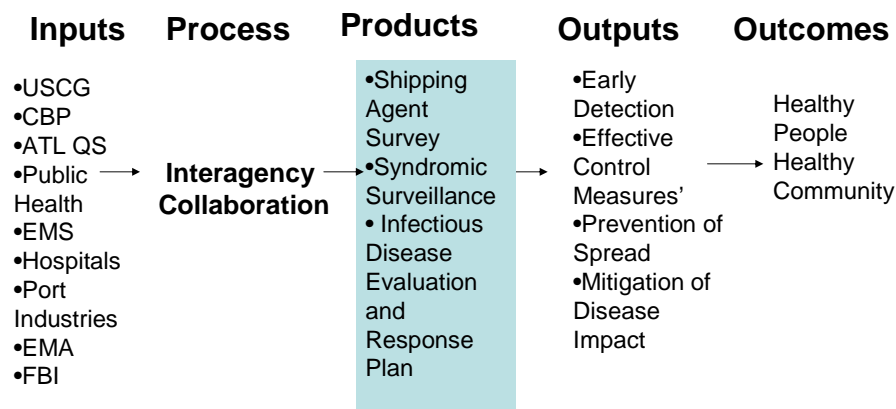


Figure 6. Communicable Disease Detection and Control: Products of Interagency Participation and Collaboration

A. SHIPPING AGENT SURVEY

1. Background

The importance of collaborating with the shipping agents was recognized early in the planning process. A plan was formulated to survey the knowledge, attitudes, and practice of shipping agents in response to sick crewmen to provide an understanding of their role and to assess their educational needs. This information was used to formulate clear guidelines for disease reporting and to begin developing an effective training program. The social network fostered through regular attendance at meetings resulted in positive communications between public health and private industry representatives. Shipping agent participation in development of the response plan was conducive to cooperation in the operational phase. The survey goal was to gain understanding of the gaps and barriers in the communicable disease reporting process and to engage the shipping agents as partners in the strategic planning process.

2. Methodology

The shipping agent survey was designed to quantitatively analyze the shipping agents knowledge, attitudes, practices for responding to sick crewmen and reporting notifiable diseases to the CDC Quarantine Station. The survey was administered through use of an on-line service and design software with an invitation to participate that was distributed by email link to the survey platform. Survey questions were related to bioterrorism, naturally occurring diseases, response to a sick crewman, and interaction with public health. A pre-test group of Naval Postgraduate School Masters in Homeland Security students with experience in maritime issues was used to refine the tool through simplification of medical terms and the addition of definitions.

The population was identified as port industry members of the Savannah Maritime Association. A total of fifty-six email invitations were distributed, thirteen were returned with invalid email addresses, for a total of forty three received invitations. A series of four reminder emails was sent during the collection phase of the survey that was conducted from October 1 through November 12, 2006.

A total of twenty-three responses were received for a 53% response rate. Individual questions had a much lower response rate. Responses were scored on a Likert scale of one through five with an average score less than 2.5 indicating disagreement with the statement and a score greater than 3.5 indicating agreement. A score of 2.5 through 3.5 indicated a neutral response. A choice of “Don’t Know” was given, but not scored numerically and omitted from the denominator.

Savannah Maritime Association members were asked to discuss and validate the survey results during their regular business meeting on November 15, 2006, with approximately thirty members in attendance. An informal focus group among attendees was conducted after the results of the survey (giving raw scores assuming only a score 3 was neutral) were given.

3. Quantitative Results

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Total Respondents	Response Average
Bioterrorism								
Bioterrorism means: An attack using biological agents, such as bacteria or viruses to spread disease.								
Prepared means: ready.								
US Seaports are prepared for a bioterrorism attack	14% 3	55% 12	14% 3	5% 1	0% 0	14% 3	22	2.10
My port is prepared for a bioterrorism attack	14% 3	50% 11	23% 5	5% 1	0% 0	9% 2	22	2.20
My agency is prepared for a bioterrorism attack	14% 3	55% 12	23% 5	5% 1	0% 0	5% 1	22	2.19
I have a personal responsibility to report a suspected bioterrorism incident at my port	0% 0	0% 0	0% 0	24% 5	71% 15	5% 1	21	4.75
I have a legal responsibility to report a suspected bioterrorism incident at my port	0% 0	0% 0	9% 2	27% 6	59% 13	5% 1	22	4.52
I know who to call to report a suspected bioterrorism incident at my port	0% 0	14% 3	0% 0	32% 7	36% 8	18% 4	22	4.11
I need more training to protect myself, my employees and my clients in the event of a bioterrorism incident	0% 0	5% 1	18% 4	45% 10	32% 7		22	4.05

Table 1. Shipping Agent Survey: Bioterrorism

Among the respondents with an opinion, most disagreed that the U.S. seaports, the Port of Savannah and their agency were prepared to respond to a bioterrorist incident (see Table 1). Most agreed that they had a personal and legal responsibility to report incidents, knew who to call to report an incident, but needed more education and training on protection from a bioterrorism incident. For any question, between one and four (range) respondents did not have an opinion to the question, average 2.0, median 1.5.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Total Respondents	Response Average
Naturally Occurring Contagious Disease								
A naturally occurring contagious disease is a disease that is easily spread from one person to another such as Tuberculosis, SARS, Yellow Fever or Cholera.								
US Seaports are prepared for naturally occurring contagious disease events	6% 1	39% 7	6% 1	39% 7	0% 0	11% 2	18	2.88
My port is prepared for naturally occurring contagious disease events	0% 0	33% 6	17% 3	33% 6	0% 0	17% 3	18	3.00
My agency has policies for naturally occurring contagious disease events	11% 2	44% 8	17% 3	17% 3	6% 1	6% 1	18	2.59
I have a personal responsibility to report a suspected naturally occurring contagious disease events at my port	0% 0	0% 0	6% 1	39% 7	50% 9	6% 1	18	4.47
I have a legal responsibility to report a naturally occurring contagious disease event at my port	0% 0	11% 2	11% 2	39% 7	33% 6	6% 1	18	4.00
I know who to call to report a suspected naturally occurring contagious disease events at my port	6% 1	17% 3	6% 1	50% 9	17% 3	6% 1	18	3.59
I need more training to protect myself, my employees and my clients in the event of a naturally occurring contagious disease event	0% 0	0% 0	22% 4	67% 12	11% 2		18	3.89

Table 2. Shipping Agent Survey: Naturally Occurring Contagious Disease

Among the respondents with an opinion, they were neutral (between 2.5 and 3.5) about U.S. seaports, the Port of Savannah, or their agency (having policies) being prepared for naturally occurring contagious disease events. Most agreed that they had a personal and legal responsibility to report, knew who to report to, but needed more

training for protection in the event of naturally occurring contagious diseases (see Table 2). For any question, between one and three (range) respondents did not have an opinion to the question, average 1.5, median 1.0.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Total Respondents	Response Average
Contagious Illness On-Board a Vessel								
Crewman that is sick with symptoms of a contagious disease, such as fever, cough, or diarrhea, and is on-board a vessel that is approaching port within 96 hours.								
US Seaports are prepared for a contagious illness on board a vessel	0% 0	18% 3	12% 2	47% 8	0% 0	24% 4	17	3.38
My port is prepared for a contagious illness on board a vessel	0% 0	24% 4	12% 2	53% 9	0% 0	12% 2	17	3.33
My agency has policies for a contagious illness on board a vessel	0% 0	35% 6	12% 2	35% 6	6% 1	12% 2	17	3.13
I have a personal responsibility to report a suspected contagious illness on board a vessel	0% 0	0% 0	0% 0	53% 9	35% 6	12% 2	17	4.40
I have a legal responsibility to report a suspected contagious illness on board a vessel.	0% 0	0% 0	6% 1	53% 9	29% 5	12% 2	17	4.27
I know who to call to report a contagious illness on board a vessel at my port	0% 0	18% 3	0% 0	47% 8	18% 3	18% 3	17	3.79
I need more training to protect myself, my employees and my clients in the event of a contagious illness on board a vessel	0% 0	0% 0	29% 5	71% 12	0% 0		17	3.71

Table 3. Shipping Agent Survey: Contagious Illness On-Board a Vessel

Among those who had an opinion, respondents were neutral (between 2.5 and 3.5) in their answers about U.S. seaports, their port, or their agency (having policies) being prepared to respond to crewmen who were sick with symptoms of a contagious disease on-board a vessel (see Table 3). Most agreed that they had a personal and legal responsibility to report the occurrence, knew who to call to report the event, but needed more training on protecting themselves or others. For any question, between two and four (range) did not have an opinion to the question, average 2.5, median 2.0. Therefore, the individual question response rate for those with opinions was no greater than 35%.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Total Respondents	Response Average
Contagious Illness in Crewman on Shore								
Crewman that is sick with symptoms of a contagious disease and has been cleared by Customs and Border Protection to come ashore.								
My agency has policies to deal with a contagious illness in a crewman on shore	0% 0	56% 9	6% 1	31% 5	0% 0	6% 1	16	2.73
I have a personal responsibility to report a suspected contagious illness in a crewman on shore	0% 0	6% 1	6% 1	50% 8	25% 4	13% 2	16	4.07
I know who to call to report a contagious illness in a crewman on shore	0% 0	6% 1	13% 2	50% 8	6% 1	25% 4	16	3.75
I have a legal responsibility to report a contagious illness in a crewman	6% 1	0% 0	13% 2	50% 8	19% 3	13% 2	16	3.86
I need more training to protect myself, my employees and my clients in the event of a contagious illness in a crewman on shore	0% 0	6% 1	19% 3	69% 11	6% 1		16	3.75
My agency would arrange medical care for a crewman with a contagious illness	0% 0	13% 2	6% 1	50% 8	13% 2	19% 3	16	3.77
My agency would be alert for signs of illness in other crewman that were with the sick crewman	0% 0	13% 2	13% 2	50% 8	6% 1	19% 3	16	3.62

Table 4. Shipping Agent Survey: Contagious Illness in Crewman on Shore

Among respondents with an opinion, they believed their agency would be alert for signs of illness (Score: 3.62) and would arrange medical care (Score: 3.77) for a crewman with a contagious illness; however, they were neutral (Score: 2.73) in regard to their agency having policies to deal with such a person (see Table 4). Most respondents agreed that they had a personal (Score: 4.07) and legal (Score: 3.86) responsibility to report, knew who to call to report (Score: 3.75), but agreed that more training was needed (Score: 3.75) for protection from a crewman with a contagious disease occurring after being clearing by CBP. For any question, between one and four (range) respondents did not know an answer, and average and median were 2.5. For any question, at most only fifteen (35% response rate) respondents had an opinion.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Total Respondents	Response Average
Quarantine								
A period of time during which a vehicle, person, or material suspected of carrying a contagious disease is detained at a port of entry.								
US Seaports are prepared to quarantine a vessel to prevent the spread of a contagious disease	0% 0	20% 3	0% 0	67% 10	0% 0	13% 2	15	3.54
My port is prepared to quarantine a vessel to prevent the spread of a contagious disease	0% 0	13% 2	0% 0	67% 10	7% 1	13% 2	15	3.77
My agency is prepared to quarantine a vessel to prevent the spread of a contagious disease	0% 0	27% 4	7% 1	53% 8	7% 1	7% 1	15	3.43
I have a personal responsibility to report a contagious disease that may result in quarantine of a vessel	0% 0	0% 0	0% 0	67% 10	27% 4	7% 1	15	4.29
I have a legal responsibility to report a contagious disease that may result in quarantine of a vessel	0% 0	0% 0	7% 1	53% 8	33% 5	7% 1	15	4.29
I have a role in supporting a quarantine order issued by the CDC Quarantine Station	0% 0	7% 1	40% 6	20% 3	20% 3	13% 2	15	3.62

Table 5. Shipping Agent Survey: Quarantine

Among those respondents with an answer, most agreed that U.S. Seaports and the Port of Savannah were prepared to impose a quarantine order, but were neutral (Score: 3.43) in their opinion regarding their own agency. Most agreed that they have a personal (Score: 4.29) and legal (Score: 4.29) responsibility to report the occurrence of a contagious disease that may result in quarantine of a vessel and that they have a role in supporting this order (Score: 3.62). For any question, no more than fourteen had an opinion; $\leq 33\%$ response rate for any question.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Total Respondents	Response Average
Communication with Public Health Includes local health department, Georgia Division of Public Health or Centers for Disease Control								
My agency maintains contact information for local public health officials	0% 0	21% 3	14% 2	36% 5	14% 2	14% 2	14	3.50
Local public health officials are available 24/7	7% 1	14% 2	21% 3	43% 6	0% 0	14% 2	14	3.17
I would call the local health department about a crewman with a contagious disease	0% 0	0% 0	21% 3	79% 11	0% 0	0% 0	14	3.79
My agency maintains contact information for the CDC Quarantine Station in Atlanta	0% 0	21% 3	21% 3	29% 4	0% 0	29% 4	14	3.10
Quarantine Station staff are available 24/7	0% 0	14% 2	29% 4	0% 0	0% 0	57% 8	14	2.67
I would call the CDC Quarantine Station about a crewman with a contagious disease	0% 0	14% 2	29% 4	29% 4	7% 1	21% 3	14	3.36

Table 6. Shipping Agent Survey: Communicating with Public Health

Among respondents with an answer, only for the question would you call the local health department (Score: 3.79) about a crewman with a contagious disease was the answer in agreement (Table 6). Between ten and thirteen respondents had an opinion for any question in this section but, in five of the six questions the results were neutral (between 2.5 and 3.5).

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Total Respondents	Response Average
Nuclear Attack Terrorist attack using a nuclear device								
US Seaports are prepared for a nuclear attack	13% 2	60% 9	7% 1	7% 1	0% 0	13% 2	15	2.08
My agency is prepared for a nuclear attack	21% 3	64% 9	14% 2	0% 0	0% 0	0% 0	14	1.93
My port is prepared for a nuclear attack	7% 1	71% 10	7% 1	0% 0	7% 1	7% 1	14	2.23
I have a personal responsibility to report a suspected a nuclear attack at my port	0% 0	0% 0	0% 0	38% 5	62% 8	0% 0	13	4.62
I know who to call to report a suspected a nuclear attack at my port	7% 1	21% 3	7% 1	43% 6	21% 3		14	3.50
I need more training to protect myself, my employees and my clients in the event of a nuclear attack	0% 0	7% 1	21% 3	43% 6	29% 4		14	3.93

Table 7. Shipping Agent Survey: Nuclear Attack

Shipping agents were asked to respond to questions regarding a nuclear attack in order to compare their response to the nuclear attack question with their response to the question regarding bioterrorism preparedness. Among those with an opinion, most disagreed that U.S. ports, the Port of Savannah or their agency (Score: 1.93) were prepared for a nuclear attack. Most agreed that they have a personal responsibility but, were neutral as far as knowing who to call (Score: 3.5) to report suspicion of activities that may result in a nuclear attack (Table 7). Most agreed that more training was needed on this subject (Score: 3.93). At most fourteen respondents answered any question with an opinion; $\leq 33\%$ response rate for any question.

4. Qualitative Results

The limitations of this survey are recognized because of the limited population, low response rate, and multiple neutral and ‘don’t know’ answers. Therefore, the opportunity was taken to engage the shipping agents in an informal focus group discussion regarding their knowledge, attitudes and practices in responding to a sick crewman. Findings of the focus group discussions indicated that maritime industry members may not have a clear understanding of the nature of a bioterrorist threat, how to recognize an attack, or what to do when it happens. Most agreed that they have a responsibility to report and respond to such an activity, but do not really know where or how they fit into the larger picture. Most shipping agents agreed that port preparedness to deal with bioterrorism and other naturally occurring disease events should be improved. Most respondents agreed that they have a responsibility to report bioterrorism-related incidents but were less sure about their role in reporting naturally occurring diseases. Industry members were unclear about the signs and symptoms of illness that warrant a report to public health and asked for clear guidance to be provided to them regarding this subject. The group agreed that a sick crewman would be taken to the local hospital emergency department for treatment or to the agent’s company physician, if there was one available. One shipping agent stated that the vessel master would always notify the shipping agent if there was a sick crewman on board, but other shipping agents did not agree. The group agreed that they would be most likely to report the occurrence of a sick crewman to the USCG rather than to CBP, the ATL QS or local

public health. The consistent theme that emerged was that industry members need more training and awareness on infectious disease and reporting issues.

5. Discussion

The crude tabulated results of the survey presented during a regular meeting of the Savannah Maritime Association on November 15, 2005, provided an opportunity for group discussion and education of public health and the maritime industry. Because of the low response rate in general and to specific questions, and the lack of any clear opinion for the majority of questions, scientific validity or generalization of the results to the larger population could not be assumed. The qualitative discussion at the Savannah Maritime Association added credibility to the premise that the quantitative results reflected gaps in knowledge and skills of the group at large. Open discussion provided an opportunity for consensus building on the validity of the interpretations of the results and defining the port industry's role in response to a bioterrorist event or natural outbreak of an infectious disease at the Georgia seaports. However, the Savannah Maritime Association membership is limited in scope and location in comparison to the entire population of shipping agents conducting business in the United States and further research is needed to ascertain whether the results are reflective of the population at large. Therefore, the survey results and informal focus group findings indicated a willingness of port industry personnel to comply with disease notification procedures once they know and understand these procedures.

B. SYNDROMIC SURVEILLANCE

1. Background

Syndromic surveillance uses pre-existing, automated, electronically transmitted, pre-diagnostic, clinical data generated in real time for medical intelligence. Its overall purpose is to facilitate the early detection of outbreaks and other events that may be of public health significance. Syndromic Surveillance also may provide an indication of the health status of a given community by increasing situational awareness. Syndromic surveillance systems are designed to capture and analyze data that may reveal statistically significant anomalies in disease and injury events prior to clinical diagnosis. It involves

live analysis of data to identify aberrations as they emerge, rather than waiting for conventional detection methods. One goal of syndromic surveillance systems is to increase epidemiological capacity to monitor and respond to community health events in the early stages of the events that may prove to be of public health significance. This can occur when patients present to emergency departments or ambulatory care centers, or call 911 for possible EMS transport to a hospital. Syndromic surveillance systems generate a flag or alert when a syndrome, such as clinical classification of chief complaints for visiting to a clinic or hospital, or calling 911 and dispatching an ambulance, occurs at numbers that are greater than expected. This provides epidemiologists with the opportunity to initiate preliminary validation possibly followed by investigation activities to determine if a disease outbreak or other event of public health significance is unfolding.⁶²

The CHD developed and implemented with the help of GDPH its current syndromic surveillance system as a component of the preparedness effort for the G8 Summit held on Sea Island, Georgia in June, 2004. Data sources included chief complaints for hospital emergency department visits and 911 calls/EMS dispatches, and types of over-the-counter pharmaceutical sales. These sources have continued since implementation of the system with periodic enhancements. Data are analyzed to identify syndromes (classifications) with numbers greater than expected and provide email notification of an aberration flag for priority syndromes associated with outbreaks or seasonal disease trends to public health that something unusual might be occurring.

FirstWatch® is a vendor-based service that provides syndromic surveillance for 911 calls with EMS dispatches.⁶³ Using a secure file transfer process, FirstWatch® gathers real-time data from MedStar (EMS Provider) 911 calls in Savannah. The real-time data are compared with historical, cumulative summary and geographic patterns.

⁶² James W. Buehler and others, "Framework for Evaluating Public Health Surveillance Systems for Early Detection of Outbreaks," *Morbidity and Mortality Weekly Report, Centers for Disease Control* 53, no. RR05 (May 7, 2004). www.cdc.gov/mmwr/preview/mmwrhtml/rr5305a1.htm. [accessed February 5, 2007].

⁶³ First Watch Early Warning System Homepage. www.firstwatch.net. [accessed February 5, 2007].

When an aberration is detected, FirstWatch® generates an alert to allow notification and subsequent evaluation of the data and possibly raise the question of a trend or pattern by local and state public health.

Specifically, FirstWatch® uses four analysis methods and provides a number of approaches for alerting. Each syndrome includes its own criteria, alerting thresholds, alerting methods, and notification list.

Analysis Methodologies include:

1. **Actual Events** compares current number of events in the syndrome with a 12-month historical average of the syndrome for day of week and hour of day. When the number of observed (current) events is three standard deviations above the historical average for the syndrome, an email alert is generated
2. **Syndrome to All** generates a ratio of the number of events within the syndrome to all 911 calls and EMS dispatches for the service at that time. The threshold is determined using the twelve-month historical data for the events and email alert is generated when the threshold is crossed.
3. **Modified Cumulative Summary** compares current events in the syndrome with a 14-day rolling average for that syndrome. When the number of observed (current) events is three standard deviations above the rolling average for the syndrome, an email alert is generated.
4. **Geo-Cluster** monitors the number of events within the syndrome for a specific geographical location.

Savannah EMS providers are focused on the incident response and would probably not manually notify public health of a call to the seaport. This syndromic surveillance infrastructure provides the notification, early detection and a warning system to evaluate a biosecurity threat and respond accordingly.

A FirstWatch® notification allows local and state public health officials to evaluate the data generating the alert and begin to interpret the circumstance. The monitored syndromes are designed to detect outbreaks, seasonal trends, bioterrorism events, and injury events. Certain medical events or law enforcement/ public safety concerns are captured in “sentinel” events, such as a hostage situation or a bomb scare by monitoring EMS dispatch data.

2. Methodology

Initial exploration of possible data sources for syndromic surveillance included absences or selected reported illnesses among the Georgia Ports Authority, USCG or CBP employees, but none of these agencies tracked these data electronically. The idea of establishing a syndromic surveillance system was abandoned temporarily. MedStar EMS staff stated at one of the meetings that they likely would not notify public health of a call to the seaport. MedStar was a FirstWatch® customer and the idea of establishing a geographic cluster for the seaport was initiated.

FirstWatch® developers identified the specific geographical location of the Port of Savannah with assistance from MedStar EMS as illustrated in Figure 7. Sixteen geographic zones were established into this geo-cluster, as illustrated in Figure 8. Public health and FirstWatch® identified the syndromes that would alert public health of a 911 call/EMS dispatch to the identified geographic location or geo-cluster. Syndromes included complaints of abdominal pain, respiratory symptoms, seizure, headache, cardiac arrest, unconsciousness, syncope, fainting, contagious disease, elevated temperature, dehydration, edema, dizziness, diarrhea, anxiety, allergic reaction, weakness, altered level of consciousness, sick person, dead person, or an unknown medical problem. These syndromes would be alerted if the current number of events in that syndrome exceeded historical levels, cumulative summary, or average expected number of events by three standard deviations. Sentinel events were identified as a hazardous material incident, toxic exposure, bomb threat, explosion or blast, suicide attempt, barricaded person, hostage situation, civil disturbance, riot, or suspicious package or substance; only one event would generate an alert. This system has been operational since August 2006.

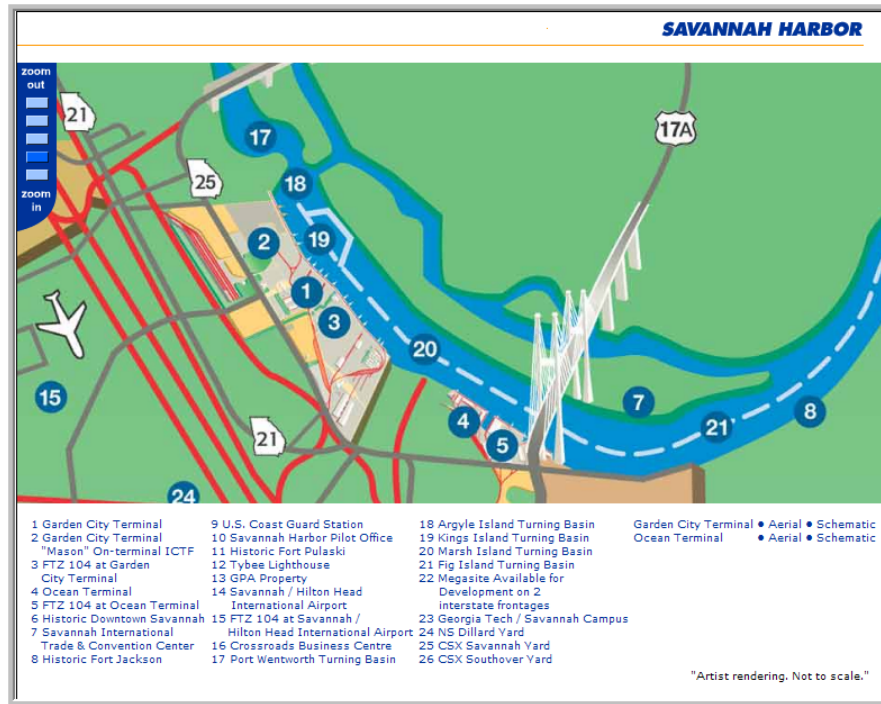


Figure 7. Savannah Harbor (From FirstWatch®)

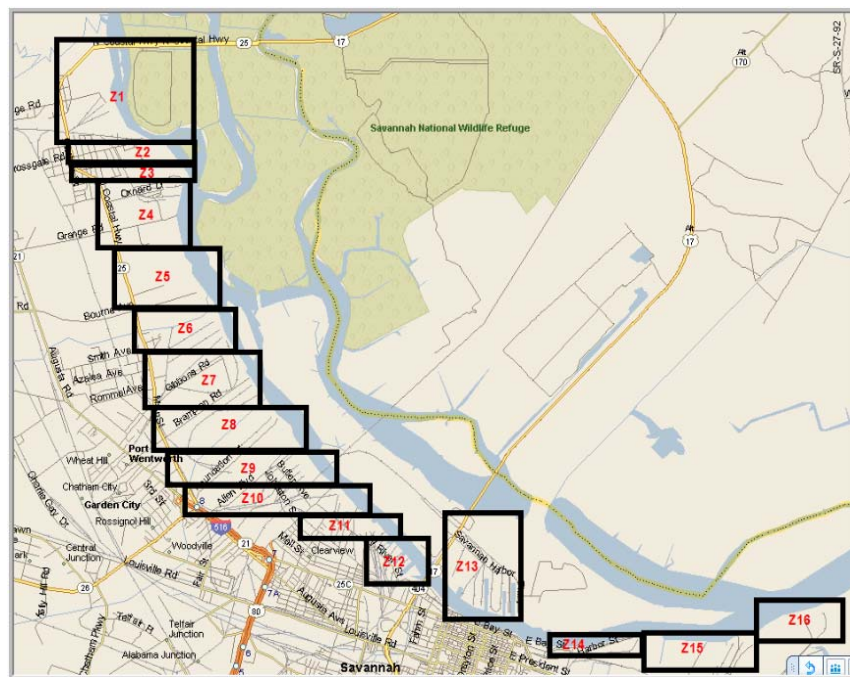


Figure 8. Savannah Harbor: Geographic Zones Comprising the Geo-Cluster (From FirstWatch®)

3. Results

This FirstWatch® geo-cluster of the Port of Savannah has resulted in notification to public health of events occurring there. The following is one such example. A minor industrial accident causing a diesel fuel spill (sentinel event) within the Savannah Harbor geo-cluster resulted in a FirstWatch® alert to public health on September 17, 2006. Eight victims were decontaminated and transported to a local hospital for medical assessment; they were discharged home in good condition following the incident. Public health officials were able to monitor the condition of the victims and the environmental impact to the community as a result.

4. Discussion

While limited in scope, the FirstWatch® geo-cluster for the Savannah seaport does provide a mechanism to enhance communication between public health and EMS, and provides a window of opportunity to establish coordination among the USCG, CBP and the receiving hospital facility. The defined geographical area accurately delineates the Port of Savannah, which results in few alert notifications. The value of the system is in the acquisition of automated information. Public health can initiate radio or phone contact with EMS, USCG or CBP to investigate the nature of the EMS call to the port in the event that notification by these agencies to public health has not occurred.

Public health response to a FirstWatch® alert is graphically displayed in Figure 9. Due to the low rate of alerts, every incident would warrant contacting EMS to ascertain the nature of the call. If the initial EMS assessment rules out an infectious process, the investigation is stopped or referred to the appropriate entity, such as the Environmental Protection Division. If the call does seem related to an infectious disease, the verification process is initiated with notification to relevant stakeholders identified in the port response protocol. Local public health may respond to the scene for further investigation and assessment.

Phase I measures include the standard public health response to any contagious disease investigation of public health significance and would apply to serious, but traditional infectious diseases, such as tuberculosis or measles (see Figure 9). Figure 9

shows that the steps to a response consist of implementation of immediate infection control measures to prevent the spread of the disease, case management, medical treatment, contact tracing and monitoring, and active surveillance for additional cases as the disease investigation progresses. The response may include the use of infection control measures such as isolation, quarantine and prophylaxis of contacts for naturally occurring diseases, such as tuberculosis or measles. These steps may be taken simultaneously as the situation dictates. Phase II response would be applied to Category A or B diseases (see Appendix 2 for definitions) of public health significance that can be easily disseminated or transmitted from person to person, result in high mortality rates, such as smallpox or viral hemorrhagic fevers, and may include a forensic investigation component. Emergency management and law enforcement personnel would always be activated in a Phase II response.

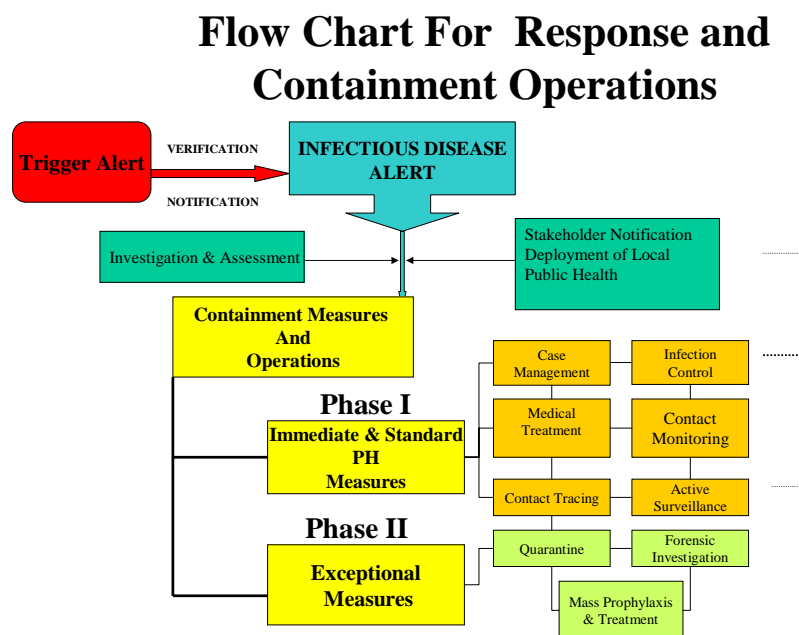


Figure 9. Syndromic Surveillance Response to a Contagious Disease (After World Health Organization Rapid Response to Pandemic Influenza)⁶⁴

An adequate epidemiological capacity is essential to enhance the public health response to a natural or manmade biological event and includes a competent workforce monitoring and interpreting data received from reliable surveillance systems that provide

⁶⁴ By A. Neu, W. Cameron, L. Smith and S. Cookson for this project.

early indicators of an infectious disease outbreak. This FirstWatch® system generates alerts and notifications that result in the need to verify the data and if the alert seems plausible, might result in a disease outbreak investigation. This investigation would rely on reliable clinical assessment, effective laboratory capacity, multi-agency cooperation, local, state, federal, and international agency cooperation, and effective risk communication with appropriate public response. The ability to detect and respond early in a disease outbreak affords the best opportunity to implement effective control measures and contain the spread of disease. Syndromic surveillance may offer an opportunity to increase the detection rate for infectious diseases among travelers.

C. INFECTIOUS DISEASE EVALUATION AND RESPONSE PLAN

This collaborative effort to develop an Infectious Disease Evaluation and Response Plan supports the State of Georgia's Strategic Plan for Terrorism Preparedness 2006 goal to coordinate prevention, response and recovery activities with the Ports Authority of Georgia. Strengthening the role of public health in port security will help "Prepare for a Safer Georgia," the stated goal of Georgia's Strategic Plan for Homeland Security. This plan could possibly serve as a response model for other communities with seaports within the southeastern United States.⁶⁵ A preliminary draft was formulated using the Hartsfield Atlanta Airport Plan as a template.⁶⁶ The first draft of this plan was presented at a large multi-agency meeting, including public health officials from Charleston held in July 2006. The plan was finally approved in December 2006, at a joint meeting held in Charleston with South Carolina and Georgia local and state public health, USCG Sector Charleston and CBP representatives. The current version of the plan is presented in this section without local contact information and is offered as a resource to other agencies involved in collaborative planning initiatives to address challenges inherent in health screening at border crossings. A list of participating agencies can be found in Appendix 1.

⁶⁵ *Georgia Strategic Plan for Homeland Security 2006* (Georgia Office of Homeland Security-Georgia Emergency Management Agency, Terrorism Emergency Response and Preparedness Division, 2006). www.gema.state.ga.us/ohsgemaweb.nsf/a29ce156b1dc53e185257118004368a/b7fa2c8c1cdd9b56852571a9004a7a75?OpenDocument. [accessed February 5, 2007].

⁶⁶ Georgia Department of Human Resources, Georgia Division of Public Health, *Infectious Disease Evaluation and Response Standard Operating Guide, Hartsfield-Jackson Atlanta International Airport, Draft, January 2006*.

D. PROLOGUE

The Georgia seaports are an extreme economic asset to the State of Georgia accounting for 276,000 jobs statewide, \$35.4 billion in revenue, and \$1.4 billion in state and local taxes. The Port of Savannah, a military Strategic Port for U.S. Army 3rd Infantry Division, has experienced 10-15% growth every year for the past sixteen years. It is the fifth largest container port in the United States with over 3,000 vessel arrivals annually with future growth expected.⁶⁷

The Port of Brunswick, located approximately eighty miles south of Savannah, is one of the fastest growing auto and heavy machinery ports in North America. The Colonels Island Terminal is utilized by twelve major auto manufacturers, supported by three auto processors. The terminal is the South Atlantic's fastest growing bulk export operation, including pulp and agricultural products from Georgia.

E. INTRODUCTION

The purpose of this standard operating plan (SOP) is to provide a coordinated response to an infectious disease event of potential public health significance at the Georgia seaports. Such a public health threat requires a comprehensive and collaborative response by multiple agencies in multiple jurisdictions, including local, regional, state, and federal assets to prevent or limit the spread of disease to the community. The goal of this SOP is to enhance collaboration between public health agencies and other local, state and federal partners in seaport security in order to effectively detect, respond to and mitigate the effects of a bioterrorism attack or other infectious disease incident.

Although all threats to public health are important, those associated with accidental or intentional chemical, radiological, improvised explosive devices, nuclear disasters or other weapons of mass destruction are beyond the scope of this SOP.

⁶⁷ Georgia Ports Authority Homepage. <http://www.gaports.com/index2.html>. [accessed February 5, 2007].

F. OPERATIONAL JURISDICTION

The following agencies have a role in detecting and responding to an international traveler arriving in the United States who is ill with an infectious disease. A description of their jurisdictional responsibilities in this regard is provided.

1. Centers for Disease Control and Protection (CDC), Division of Global Migration and Quarantine, Atlanta Quarantine Station (ATL QS)

The Secretary of the Department of Health and Human Services has statutory responsibility for preventing the introduction, transmission, and spread of communicable diseases in the United States. Under its delegated authority, the Division of Global Migration and Quarantine, works to fulfill this responsibility through a variety of activities, including the operation of Quarantine Stations at ports of entry, establishment of standards for medical examination of persons destined for the permanent U.S. settlement, and administration of interstate and foreign quarantine regulations, which govern the international and interstate movement of persons, animals, and cargo. The legal foundation for these activities is found in Titles 8 and 42 of the US Code for Federal Regulations (CFR) and relevant supporting regulations.⁶⁸ The ATL QS has operational jurisdiction with authority to detain, medically examine or conditionally release individuals believed to be carrying a communicable disease of public health significance.⁶⁹ The ATL QS bears primary responsibility in identifying and responding to human health risks arriving at all ports of entry in Georgia, Alabama, Arkansas, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee.

2. Coastal Health District (CHD)

The Coastal Health District (CHD) is entrusted by the State of Georgia with responsibility for the health of the community. The CHD serves Bryan, Camden, Chatham, Effingham, Glynn, Liberty, Long and McIntosh Counties. Its mission is to ensure conditions in which people can be healthy and to provide leadership in the prevention of disease and injury. The CHD bears primary responsibility for the

⁶⁸ Center for Disease Control, National Center for Infectious Diseases Homepage. <http://www.cdc.gov/ncidod/dq/lawsand.htm>. [accessed February 5, 2007].

⁶⁹ 42 CFR Parts 70 and 71. <http://www.cdc.gov/ncidod/dq/lawsand.htm>. [accessed February 5, 2007].

management and monitoring of individuals with a disease of public health significance upon disembarkation from an international vessel at the port and for the protection of the community against such a threat.

3. Georgia Division of Public Health (GDPH)

The Georgia Division of Public Health (GDPH) is an agency of the Georgia Department of Human Resources. GDPH is the lead agency entrusted by the people of the State of Georgia with the ultimate responsibility for the health of communities and the entire population. The vision of the GDPH is a Georgia with healthy people, families, and communities, where all sectors unite by pooling their assets and strengths to promote health for all. The GDPH provides service and leadership to each of the 18 health districts to promote, protect and improve the health and safety of the people of Georgia.

4. United States Coast Guard (USCG) Sector Charleston

Sector Charleston is responsible for all U.S. Coast Guard (USCG) operations in the States of Georgia and South Carolina. The Marine Safety Unit (MSU) Savannah jurisdiction has Captain of the Port authority over the ports of Savannah and Brunswick, Georgia. The Charleston Sector Commander is the Captain of the Port (COTP) for the ports of Little River, Georgetown, Charleston, and Port Royal, South Carolina.

Every ship, when in a port of the United States, is subject to control by the federal government in so far as this control is directed toward verifying that the vessel is in compliance with international maritime conventions and U.S. law. The 33 CFR Part 6.04-8 gives the COTP the authority to "control the movement of any vessel within the territorial waters of the United States under his jurisdiction, whenever it appears to him that such action is necessary in order to secure such vessel from damage or injury, or to prevent damage or injury to any vessel or waterfront facility or waters of the United States".⁷⁰

Occasionally the USCG will receive information from boarding or inspection teams, vessel agents, shipping companies, masters of ships at sea, or elsewhere, notifying

⁷⁰ Protection and Security of Vessels, Harbors, and Waterfront Facilities.
<http://www.mxak.org/regulations/33CFR/33cfr6.01.htm>. [accessed February 5, 2007].

it of an ill crew member. In the interest of public safety, the Coast Guard's goal is to notify public health officials of all shipboard illnesses as soon as possible to prevent the spread of communicable diseases. If necessary, the COTP will impose controls on the vessels movements. The USCG may assist in transporting medical services to a vessel to evaluate sick persons.

5. United States Customs and Border Protection (CBP)

U.S. Customs and Border Protection (CBP), an agency of the Department of Homeland Security, is responsible for border protection and security. CBP enforces all laws and regulations of the U.S. federal government related to importation, exportation, traveler admissibility issues and immigration policies.

6. Port Industries (Port Authority and Vessel Services)

Ports Authority personnel, stevedores and shipping agents are responsible for disease notification to the ATL QS and local public health.

G. CONCEPTS OF OPERATION

The term traveler is used in this SOP and includes international sailors and passengers arriving on a foreign vessel at the Georgia seaports.

The term Coastal Health District includes county and district personnel under the supervision of the District Health Director.

- Incident Management: An Incident Command Structure (ICS) will be established to facilitate and coordinate the initial response by multiple agencies. When this SOP is activated, the CHD, ATL QS, USCG, CBP, GDPH, local Emergency Management Agency and the Georgia Office of Homeland Security-Georgia Emergency Management Agency (OHS-GEMA) will respond under a Unified Command (UC) as operational authorities. Initially, UC will be established by conference call communication with USCG, CBP, ATL QS, GDPH and CHD participation. If the incident expands beyond a limited public health concern, UC will be established at the Chatham or Glynn County Emergency Management Agency Emergency Operation Center as appropriate.
- The Federal Bureau of Investigation (FBI) will assume the role of Incident Commander, if the incident involves one of the Category A diseases or a

credible threat of a federal offense. If it involves a Category B disease, the FBI should at least be involved and their role determined as events unfold.

- Based on the magnitude of the disease burden, potential for rapid spread, availability of mitigating strategies, and other factors, a local, state and/or federal emergency may be declared (Official Code of Georgia Section 38-3-51).
- Vessels are required to provide ninety-six-hour advance electronic notice of their arrival. A disclosure is required at that time if there are any ill travelers on board. An illness that meets federal criteria requires notification to the ATL QS and must be evaluated prior to disembarkation of the vessel. In the case of a death on board, it is also mandatory that the vessel master notifies the ATL QS.
- Crew may join the vessel in any port. An infected person would not exhibit signs and symptoms of illness, if the incubation period of the disease has not been completed prior to arrival in the United States. The traveler may disembark from the vessel prior to the onset of symptoms.
- Port industry or vessel services personnel are the most likely point of contact for travelers with illnesses that do not meet federal notification criteria during initial screening.
- Travelers with minor illnesses that are cleared by CBP for admissibility to the United States are permitted to seek medical care on shore. Port industry or vessel services may arrange medical services for sick travelers while in port.
- Local health care providers may not recognize the significance of early presentation of symptoms compatible with international infectious diseases of public health significance because of the low incidence of these diseases in the United States.
- The USCG may receive notification from boarding or inspection teams, vessel agents, shipping companies, or masters of ships at sea of a crew member or traveler with an illness.
- CBP officers may be the first to identify an ill crew member or traveler and have primary responsibility to detain and refuse entry to persons suspected of being infected.
- CBP officers will serve as the main point of contact at the Georgia Ports for emergency medical services (EMS) and others first responders that may evaluate a potential disease threat of public health significance.
- The ATL QS, with support from the CHD, will assess the potential public health threat posed by the traveler's illness and determine the immediate healthcare needs, disease control and prevention measures required.
- A Public Health Assessment and Surveillance Team (PHAST) may be activated and deployed to the Ports of Savannah or Brunswick to conduct

public health field investigation activities. The mission of the team is to perform public health assessment and surveillance, and make recommendations to the District Health Director. The team is flexible in structure and is designed to meet the demands of the incident and may include an environmentalist, epidemiologist, nurse, physician and other public health specialist, as required. PHAST, assisted by EMS, will evaluate, treat, and arrange transport of the reported ill traveler to prevent further complications or unnecessary communicable disease exposures.

- Public health, EMS or other healthcare providers and ancillary personnel will follow standard medical protocols when responding to travelers with suspected infectious diseases and use appropriate personal protective equipment (PPE). During transport, the ill traveler should wear a surgical or N95 mask and skin rashes should be covered. Exposure to blood, secretions, excretions or other potentially infectious materials is prevented through the use of standard precautions. EMS providers in the patient care section of the transport unit will maintain an appropriate level of PPE to prevent spread of the disease.
- The infectious traveler meeting federal criteria for a notifiable disease will be treated in a local medical treatment facility that is capable and willing to provide medical evaluation and treatment. The ATL QS maintains a Memorandum of Understanding with St Josephs/ Candler Healthcare System in Savannah to establish a framework for the care and treatment of international travelers suspected to be infected with an infectious disease of public health significance. Other district hospitals may also provide care.
- The medical treatment facility will be consulted by CHD staff or EMS prior to transport of the traveler as indicated. Upon arrival, the traveler will be immediately placed in the appropriate isolation area.
- The attending physician will regularly consult with the District Health Director, State medical epidemiologist and ALT QS staff while determining the diagnosis and disposition of the traveler.
- The ill traveler will have an assigned CHD epidemiologist to monitor progress of the case for any information pertinent to the epidemiologic investigation. The CHD epidemiologist will regularly consult with the District Health Director, State medical epidemiologist and ALT QS staff
- The Georgia Public Health Laboratory (GPHL) will supply the medical provider with appropriate resources for specimen collection and laboratory testing. The CHD epidemiologist will coordinate specimen submission to the Georgia Public Health Laboratory.
- The medical provider will obtain, package and transport clinical samples per GPHL protocol. The CDC will provide confirmatory testing as indicated using standard protocol.

- Chain of Custody for all specimen collection is maintained if there is suspicion of illegal activity.
- The Georgia State Patrol will provide transportation of clinical specimens to the GPHL and/or the CDC laboratory.
- The Federal Bureau of Investigation (FBI) or other law enforcement agency investigating a credible threat of bioterrorism will coordinate the public health and medical response to the incident. CHD and GDPH (Public Health) staff will comply with all aspects of the forensic investigation in gathering criminal and epidemiological evidence.
- Public Health will evaluate and determine exposure of other travelers on board the vessel with the ill traveler. Quarantine of exposed individuals may be determined to be a necessary control measure by the ATL QS. The purpose of quarantine is to limit mobility of travelers to prevent the spread of infection and to allow monitoring of the travelers' health for signs and symptoms of the disease.
- Public Health will provide information for exposed travelers to include clinical facts, laboratory results, and any appropriate medical and/or public health follow-up. It is anticipated there may be a small group either refusing or not being able to be medically managed. Coercion through law enforcement may be required based on individual circumstances under the direction of the UC.
- Public Health will conduct enhanced and active surveillance with close monitoring of syndromic surveillance data sources. Active surveillance will be conducted among quarantined travelers to include at least daily interviews designed to rapidly identify anyone who develops signs or symptoms consistent with a disease of public health significance.
- The CHD Public Information Officer will coordinate with hospital, state and federal risk communicators in a Joint Information Center, while ensuring patient confidentiality and controlled release of essential information to the media.
- Necessity for disinfection of the vessel will be determined by the ATL QS and coordinated through the USCG. Local decontamination and environmental surety will be coordinated with OHS-GEMA, Georgia Department of Natural Resources, Environmental Protection Division, the Environmental Protection Agency and the GDPH.
- The cost incurred by all agencies will be monitored and annotated routinely. Their submission for reimbursement will be coordinated through the Unified Command Finance Section if there is a state or federally declared disaster.

H. NOTIFICATION SCENARIOS

Communication flow model is shown in Figure 10 with immediate notification of all core agencies required for any level of activation.

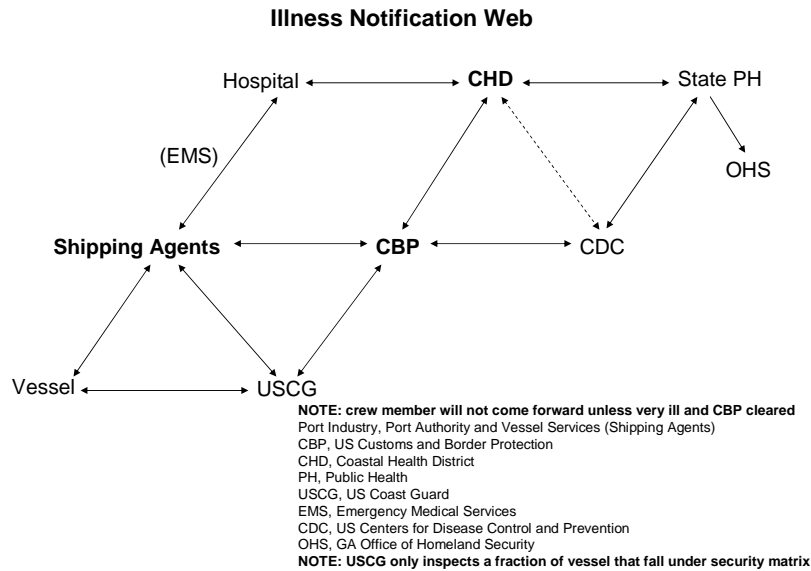


Figure 10. Illness Notification Web (From S. Cookson and D. Kim for this project)

There are three possible notification scenarios to alert the ATL QS of a possible infectious disease threat that impacts communication channels and response:

1. An ill traveler is reported to the ATL QS by the vessel master prior to entering the port (see Figure 11).
2. An ill traveler is identified by the USCG or CBP officer during vessel inspection and screening procedures (see Figure 12).
3. A traveler develops an illness while in port and under the supervision of vessel service staff. (see Figure 13).

Communication channels and response will be discussed for each scenario.

- General applied principles for the ill traveler(s) include: (1) physically separate from other people; (2) determine the need for immediate medical care; (3) assess potential for disease spread to other people; (4) when indicated, safely transport to one of the pre-designated medical treatment facilities (MTF) for isolation, further evaluation and care; and (5) provide alert notifications to other stakeholders.

- General applied principles for other travelers considered to have been exposed to the ill traveler include: (1) provide information on the illness, response, and health implications; (2) obtain complete contact information; (3) administer secondary prevention activities, such as providing vaccines or prophylactic medications; (4) determine and apply the need for quarantine; and (5) provide alert notifications to other stakeholders.

A sequence of steps will be initiated from the point of notification of a person with a suspected disease of public health significance to final disposition of that person and any exposed individuals.

Scenario I: An ill traveler is reported to the CDC ATL QS by the vessel master prior to entering the port

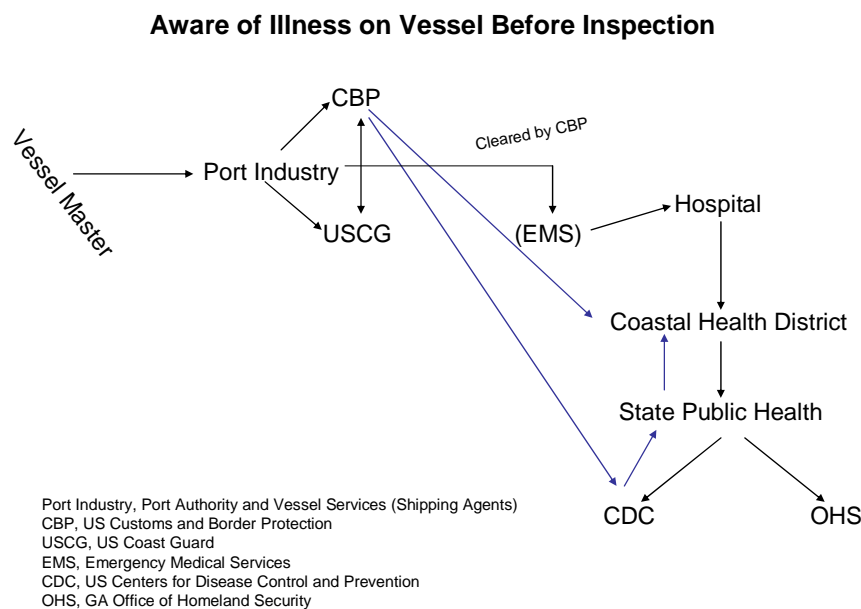


Figure 11. Notification Scenario: Aware of Illness on Vessel Before Inspection
 (From S. Cookson and D. Kim for this project)

- 1) The vessel master reports a suspected infectious illness to the shipping agent.
- 2) The shipping agent notifies USCG and CBP.
- 3) CBP notifies the CDC ATL QS and Coastal Health District. The State Public Health (GDPH) is notified by the ATL QS and the Coastal Health District.
- 4) GDPH notifies the OHS/GEMA.

- 5) Unified Command is established.
- 6) USCG will direct the vessel with the ill traveler on board to a predetermined area in the port.
- 7) ATL QS determines further action based on initial information obtained from the calling source.
- 8) The calling source provides the following preliminary medical information concerning the sick traveler:
 - a) Nationality of traveler and availability of interpreter.
 - b) Current clinical status; date of onset of symptoms; specific symptoms: any systemic, such as anorexia, malaise, myalgias; neurological such as headaches, paralysis; respiratory, including cough, fever, dyspnea at rest or on exertion, chest discomfort or pain; abdominal such as diarrhea, vomiting, nausea, abdominal cramps; skin manifestations such as rash; bleeding problems; and past medical history.
 - c) Port of origin and brief travel history of the sick traveler.
 - d) Contact with other persons with similar symptoms and if others on the vessel are ill.
- 9) The ATL QS determines the need for further medical evaluation. The ATL QS may request further medical evaluation of the case by local public health. This evaluation will be obtained by on-site assessment by the Public Health Assessment and Surveillance Team (PHAST) and/or EMS as indicated.
- 10) Immediate EMS dispatch is indicated if the condition is related to a non-infectious etiology or is life threatening. On-site public health assessment is precluded in this situation. EMS will immediately respond and transport the person to a local hospital using appropriate precautions. Public health assessment would then proceed, either on-site at, or by phone with, the local hospital emergency department.
- 11) If immediate EMS dispatch is not indicated, the PHAST members (nurses and/or physician), with support from EMS, will secure appropriate escort to board the vessel to assess and triage the sick traveler and quickly determine the health status of the remaining crew. The sick traveler is moved to the deck of the vessel by previously exposed crewmen as an additional safety measure to improve ventilation and reduce risk of disease transmission. PHAST member(s) evaluate the sick crewman and record findings. Clinical information collected may include, but is not limited to: residence and demographics, two- week history of travel,

symptoms as listed above in #8 and other clinical assessment, as may be necessary on a case-by-case basis. Consultation by phone or radio with UC may be obtained at any time during this process.

- 12) Investigation, coordination and implementation of control measures, transport, quarantine and other on-site action steps are taken in consultation with the UC.
- 13) Consultation with the involved shipping agent is done to ascertain if there are requirements in their medical protocols or procedures that would impact needed treatment.
- 14) The best disposition of the case is determined. Options include immediate transportation to a local hospital for urgent medical care, urgent/ routine transportation to the designated company physician, or recommendation to continue medical care with isolation (separate room, if possible) on board ship, with follow-up by the company physician.

Scenario II: An ill traveler is identified by CBP or USCG during screening procedures

CBP Becomes Aware of Illness Onboard Vessel during Inspection

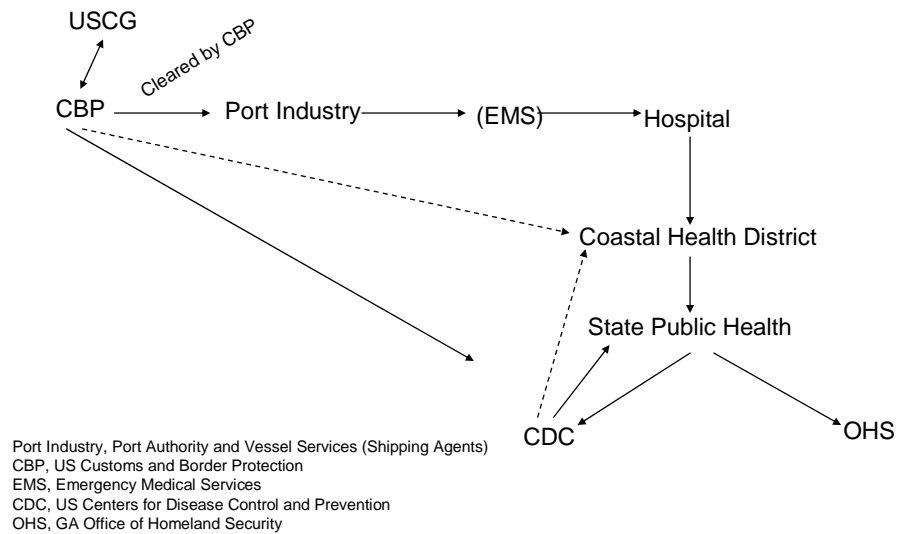


Figure 12. Notification Scenario: Illness Noted During Inspection Process
 (From S. Cookson and D. Kim for this project)

1. USCG or CBP officer notifies both agencies.

2. CBP notifies the appropriate shipping agent
3. CBP notifies the CDC ATL QS and Coastal Health District. The State Public Health (GDPH) is notified by the ATL QS and the Coastal Health District.
4. GDPH notifies the OHS/GEMA
5. Unified Command is established.
6. Steps 8-14 above are followed.

Scenario III: A traveler develops an illness while in port and under the supervision of port industry staff.

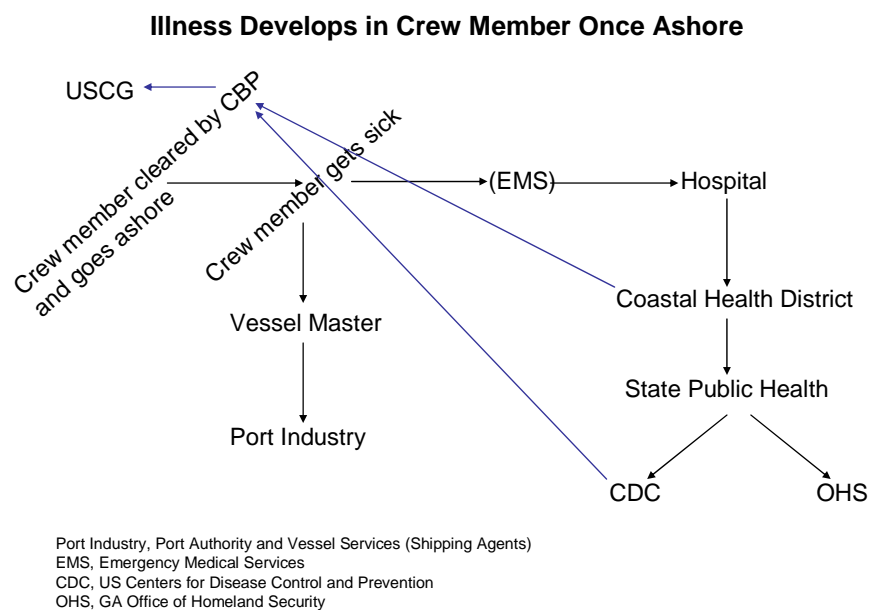


Figure 13. Notification Scenario: Illness Noted After Disembarking
 (From S. Cookson and D. Kim for this project)

1. The traveler is cleared by CBP, leaves the vessel and goes ashore.
2. The traveler gets sick with signs and symptoms of a communicable disease.
3. The traveler notifies the shipping agent, this might occur through the vessel master.
4. The shipping agent arranges medical treatment with the company physician or dispatches EMS for transport to the hospital and notifies the USCG.
5. USCG notifies CBP.

6. CBP notifies CDC ATL QS and Coastal Health District (CHD)/State Public Health (GDPH)
7. EMS, the attending or emergency department physician notifies CHD of the case. Initial medical evaluation results are communicated.
8. CHD notifies the GDPH.
9. GDPH notifies the CDC ATL QS and GEMA-OHS.
10. Unified Command is established.
11. Steps 12-14 above are followed.

I. PUBLIC INFORMATION

The Joint Information Center (JIC) will operate under the UC and coordinate, review and clear all communication messages, methods and spokespersons for the following groups:

- General public
- Media
- Patients
- Passengers and crew (travelers)
- Spokespersons
- Ports Authority staff

The JIC will work closely with those affected by the situation to ensure the most up-to-date and accurate information is disseminated. The JIC will coordinate and prepare for site visits and potential statements from very important persons (VIPs), including, but not limited to city, county, state government officials, port officials, and federal officials. The JIC will designate spokespersons for each audience. No personnel will speak with outside officials or media unless first coordinated through the JIC.

The hospital Public Information Officer (PIO) will serve as a member of the JIC and coordinate any communication about the evolving clinical situation by the attending physician and staff to the media or public through the JIC. This may include the patient's laboratory results or status changes. Patient confidentiality must be maintained. The attending physician (emergency medicine or infectious diseases/internal medicine, if admitted) will communicate any changes in the patient's laboratory results or status

changes directly with the District Health Director (DHD). The DHD will notify the appropriate State Medical Epidemiologist and the ATL QS Medical Officer of the results/communications.

IV. SUMMARY AND CONCLUSIONS

As a result of the collaborative planning effort undertaken by local, state and federal agencies which have jurisdictional responsibilities to prevent the introduction of infectious disease threats of public health significance into the United States, a more effective process for detecting and responding to a microbial threat has been established at the Georgia Ports of Savannah and Brunswick. Response capability and capacity has been expanded through a collaborative network with common objectives for enhanced information sharing, open communication channels, clarified agency roles and responsibilities, strengthened relationships and unified response. The establishment of this network has increased the likelihood of early detection of a biological threat with implementation of effective disease control measures to mitigate the public health impact of such an event.

The research questions for this project were:

1. Who are the key stakeholders from the public health perspective in protecting the U.S. public from the intentional or unintentional introduction of microbial threats that originate abroad?
2. What is the role of local public health in supporting the operations of the CDC Quarantine Stations?
3. How can local, state and federal agencies with jurisdictional authority and responsibility collaboratively develop an infectious disease evaluation and response protocol to reduce the risk of an infectious disease of public health significance from entering the United States?
4. How can public-private partnerships support this process?

Who are the key stakeholders from the public health perspective in protecting the U.S. public from the intentional or unintentional introduction of microbial threats that originate abroad? Based on the collaborative process, it is clear that effective disease detection and control is dependent upon a unified response by many local, state and federal entities, as well as private partnerships with industry. The CDC Quarantine Station bears primary responsibility at the federal level, but it is unable to achieve its mission without a collaborative network of partner agencies and other community

stakeholders. The challenge lies in the sustainability of this collaborative network and institutionalizing and formalizing the processes so that it does not depend on key individuals for success.

What is the role of local public health in supporting the operations of the CDC Quarantine Stations? This research has demonstrated the prime role of local public health in supporting the operations of the ATL QS. The overlapping functions of local, state and federal public health, to perform biosecurity planning, information sharing, surveillance, assessment and response, unite local, state and federal entities in protecting the population from microbial threats. Local public health provides the on-scene component for state and federal agencies in performing disease assessment, investigation and mitigation. Local public health has a responsibility to maintain a collaborative network of partner agencies and other community stakeholders for open communication, cooperation and information sharing. These relationships provide the portal through which the effectiveness of the ATL QS can be expanded at the local level.

How can local, state and federal agencies with jurisdictional authority and responsibility collaboratively develop a rapid infectious disease evaluation and response protocol to reduce the risk of an infectious disease of public health significance from entering the United States? The Collaborative Capacity Model described by Thomas et al provides a framework for analyzing success of such endeavors. In this instance, all participating agencies were motivated, had a vested interest in the outcome, and benefited from improved processes and social network formation. Participants were open, honest and respectful in discussing the various challenges and barriers. The structure of the group included relevant stakeholders with sufficient authority to make and sustain policy decisions within their own agency and within the collaborative network. The five components of the Collaborative Capacity Model including structure, people, lateral mechanisms, incentives and purpose and strategy were sufficient to describe these processes. One component that may be lacking within the Collaborative Capacity Model is the element of leadership. In the opinion of this author, leadership is critical as a driving force in successful collaborative initiatives. The driving force in this project was provided by each of the members of the core work group at different times during the process, but primary responsibility for coordinating the meetings and developing the

documents was undertaken by the CHD. Consistency and perseverance in driving the process forward was a critical factor in the success of this endeavor. The democratic leadership style of the core work group members was a defining factor in obtaining buy-in from multiple stakeholders across jurisdictions, but the initiative and sustainability was provided through the leadership of CHD.

How can public-private partnerships support this process? Government entities have traditionally relied on their own ability to screen travelers and prevent the entry of infectious diseases into the United States and have not engaged private industry in the process. This research has demonstrated the willingness of shipping agents to participate in the disease reporting process and highlighted the lack of a clearly defined mechanism for them to do so. The Savannah Maritime Association is a member of the Area Maritime Security Committee with a membership that encompasses port industry and local, state and federal governmental agencies with jurisdictional responsibility for the Georgia Ports. The Savannah Maritime Association provides a common venue for all stakeholders. Fear of disease and concerns regarding the onset of an influenza pandemic may provide a further impetus for cooperative participation this process.

A “seeing is believing” strategy may improve the odds of participation in an educational forum. The Port of Savannah has experienced several potential incidents that could have resulted in a public health emergency. The threat of pandemic influenza and other emerging or reemerging infections could be utilized in the attempt to foster interest in a collaborative threat reduction plan. These incidents could be utilized to lend credibility to the threat and underscore deficiencies in the current system. Of course, the shipping agents have to be present in order to “see,” so introduction of the biothreat scenarios should be done during a group gathering, such as a Savannah Maritime Association meeting to elicit membership “buy-in.” Educational information delivered by short briefings at monthly meetings may be an effective means to support ongoing training initiatives.

Building collaborative capacity among agencies that bear jurisdictional responsibility in the prevention, detection, control and mitigation of the impact of a microbial threat upon the population is a critical homeland security initiative.

Implementation of these measures may provide a greater degree of biosecurity at the Georgia Ports (see Figure 14) as the output resulting from interagency participation, cooperation and improved surveillance. The predictive factor for detection of infectious diseases is increased through better screening procedures and heightened surveillance. A collaborative effort to establish an infectious disease response protocol may prevent or reduce the impact of an infectious disease threat through enhanced information sharing, communication and cooperation. Essential partnerships have been established and a model for collaborative response to a biothreat at the Georgia Ports has been developed.

Biological Threat Detection and Control

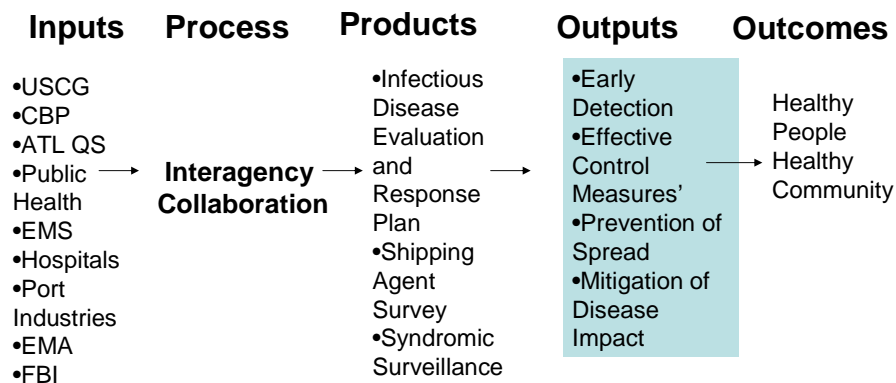


Figure 14. Communicable Disease Detection and Control: Outputs Resulting from Interagency Participation, Cooperation and Surveillance

V. RECOMMENDATIONS

Biological Threat Detection and Control

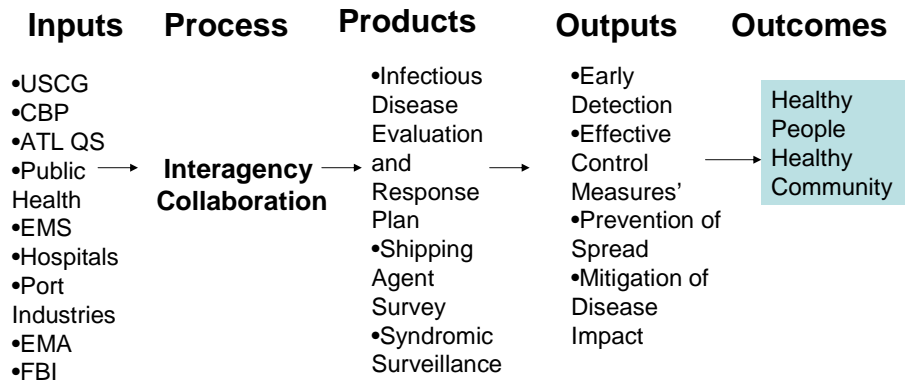


Figure 15. Biological Threat Detection and Control: Ultimate Outcomes

Recommendations are related to the outcomes of this project, a healthy community and healthy people, as shown in Figure 15, through the prevention or mitigation of an infectious disease threat by interagency network building and final response. These recommendations include:

1. Perform additional research to give more meaning to the shipping agent survey results and to validate them for a larger population, in order to generalize the findings.
2. Establish regional approaches to infectious disease surveillance to include all seaports under the jurisdiction of the ATL QS.
3. Determine the effectiveness of establishing a UC conference call through a full-scale exercise.
4. Determine whether syndromic surveillance for EMS calls using seaport geo-clusters is an effective data source for increasing the detection rate and decreasing the response time for potential infectious diseases among nautical travelers.

5. Provide on-going educational briefings at the Savannah Maritime Association meetings to maintain awareness of disease reporting requirements and mechanisms.
6. Develop methods to monitor the sustainability of the collaborative network, and institutionalize and formalize the processes so that it does not depend on key individuals for success.
7. Determine the role that leadership attributes in interagency collaboration for homeland security initiatives.

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APPENDIX A: PARTICIPATING AGENCIES

Atlanta Quarantine Station, Division of Quarantine and Global Migration, Centers for Disease Control and Prevention

Brunswick Emergency Medical Services

Brunswick Police Department

Chatham County Emergency Management Agency

Coastal Health District

Customs and Border Protection

Federal Bureau of Investigation

Georgia Division of Public Health

Georgia Emergency Management Agency

Georgia Public Health Laboratory

Glynn County 911 Center

Glynn County Emergency Management Agency

Glynn County Emergency Medical Services

MedStar Emergency Medical Services

Memorial Health University Hospital

Savannah Maritime Association

Southeast Georgia Health System Brunswick Campus

St Josephs/Candler Healthcare System

Trident Health District, South Carolina Department of Health and Environmental Control

United States Coast Guard Marine Safety Unit, Savannah

United States Coast Guard, Sector Charleston

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APPENDIX B: CATEGORY A AND B DISEASES/AGENTS, CENTERS FOR DISEASE CONTROL AND PREVENTION

CATEGORY A (DEFINITION BELOW)

- [Anthrax](#) (*Bacillus anthracis*)
- [Botulism](#) (*Clostridium botulinum* toxin)
- [Plague](#) (*Yersinia pestis*)
- [Smallpox](#) (variola major)
- [Tularemia](#) (*Francisella tularensis*)
- [Viral hemorrhagic fevers](#) (filoviruses [e.g., Ebola, Marburg] and arenaviruses [e.g., Lassa, Machupo])

CATEGORY B (DEFINITION BELOW)

- [Brucellosis](#) (*Brucella* species)
- Epsilon toxin of *Clostridium perfringens*
- [Food safety threats](#) (e.g., *Salmonella* species, *Escherichia coli* O157:H7, *Shigella*)
- [Glanders](#) (*Burkholderia mallei*)
- [Melioidosis](#) (*Burkholderia pseudomallei*)
- Psittacosis (*Chlamydia psittaci*)
- [Q fever](#) (*Coxiella burnetii*)
- [Ricin toxin](#) from *Ricinus communis* (castor beans)
- Staphylococcal enterotoxin B
- Typhus fever (*Rickettsia prowazekii*)
- Viral encephalitis (alphaviruses [e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis])
- Water safety threats (e.g., *Vibrio cholerae*, *Cryptosporidium parvum*)

CATEGORY C (DEFINITION BELOW)

- Emerging infectious diseases such as Nipah virus and hantavirus

CATEGORY DEFINITIONS

Category A Diseases/Agents

The U.S. public health system and primary healthcare providers must be prepared to address various biological agents, including pathogens that are rarely seen in the United States. High-priority agents include organisms that pose a risk to national security because they

- can be easily disseminated or transmitted from person to person;
- result in high mortality rates and have the potential for major public health impact;
- might cause public panic and social disruption; and
- require special action for public health preparedness.

Category B Diseases/Agents

Second highest priority agents include those that

- are moderately easy to disseminate;
- result in moderate morbidity rates and low mortality rates; and
- require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.

Category C Diseases/Agents

Third highest priority agents include emerging pathogens that could be engineered for mass dissemination in the future because of

- availability;
- ease of production and dissemination; and
- potential for high morbidity and mortality rates and major health impact.

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